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ABSTRACT

Contained here are the technical appendices to the report on Project LONGSTEP's methodology and findings. The general emphasis of Project LONGSTEP was on the identification of changes in student achievement that occur as a result of intensive educational innovation. Its primary purpose was to analyze overall differences in achievement growth among educational approaches; an educational growth model in which achievement was related to innovative emphasis, number of minutes of instruction per day, pretest, socioeconomic status, and teaching qualifications; a posttest achievement score statistically adjusted for pretest and socioeconomic differences; groups of students with similar educational experiences who, on the average, performed either much better or much worse than was expected from their pretest and socioeconomic status; and students who demonstrated particularly large achievement gains during two consecutive school years. "Data Collection Instruments and Guidelines" developed for Project LONGSTEP referenced in Vol. I, Chapter II, Section C, will be accessioned TM 005 987 in RIEMAY77. (RC)

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IMPACT OF EDUCATIONAL INNOVATION ON STUDENT PERFORMANCE:

PROJECT METHODS AND FINDINGS FOR THREE COHORTS

Project LONGSTEP Final Report: Volume I

APPENDICES

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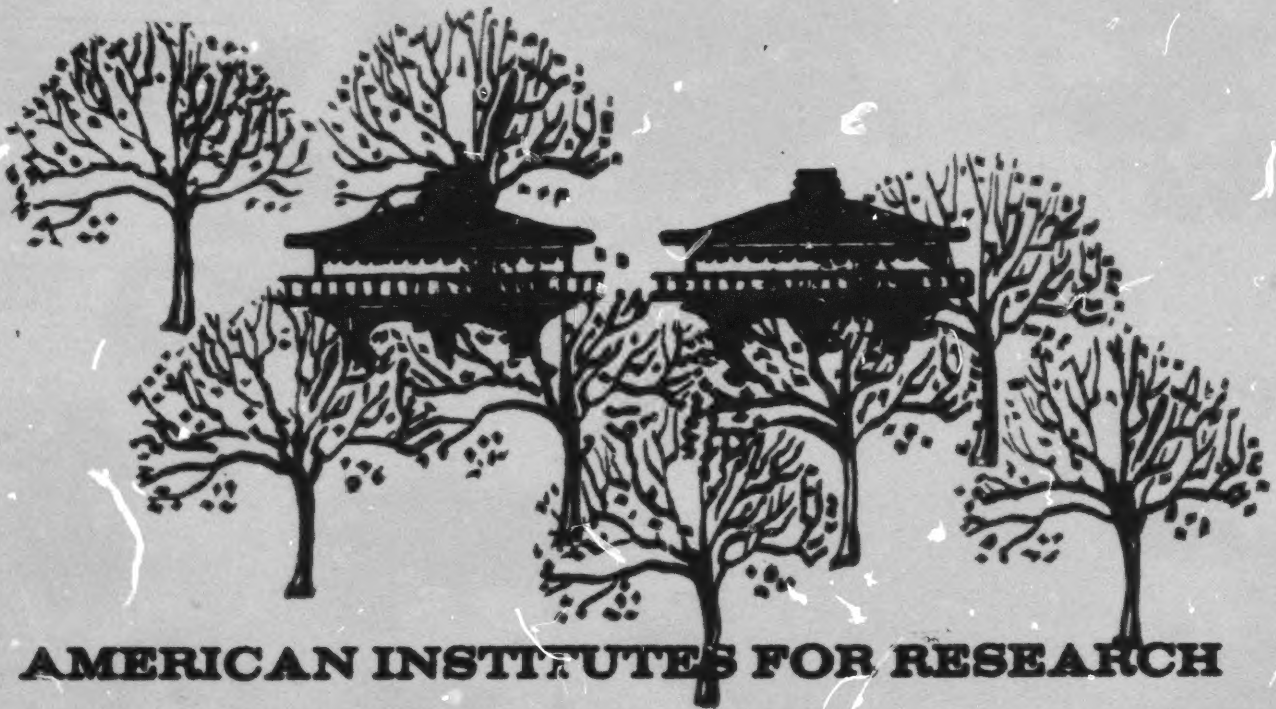

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AMERICAN INSTITUTES FOR RESEARCH
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APPENDICES

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APPENDIX II-A

Guidelines for the Selection of Candidate Programs for Participation in Project LONGSTEP

APPENDIX II-A

Guidelines for the Selection of Candidate Programs for Participation in Project LONGSTEP

1. Program Scope and Intensity

   a. The program should be located in formally established public or private elementary or secondary schools.

   b. A sizable proportion of the students in the school (i.e., greater than 10%) should be included, making a total of at least 200 students spanning several classes and at least three grade levels.

   c. The number of students in the program should be adequate to provide a reasonable number of cases per cell in the anticipated analytic schemes.

   d. The innovative or experimental component should be administered in the same grades in several schools.

2. Program Content

   a. The greater the variety of treatments within a program the better, as long as an adequate number of students are involved in each component.

   b. There should be a high degree of behavioral specificity in the description of innovations. It must be possible to describe exactly what is done, not merely the formulation of a policy.

   c. The program should have explicit objectives and expected outcomes which have applicability in a variety of educational settings.

   d. The program should have a strong theoretical basis and/or clear rationale indicating in what manner it departs from traditional class instruction and the reasons for such change.

e. The program should involve, or have a high probability of obtaining, adequate control or comparison groups.

f. The program should be reasonably free from significant negatives which are unlikely to change; for example, a program in an area with very low teacher salaries, inadequate facilities, or overcrowded classrooms should be avoided unless the program is intended to overcome these deficiencies.

3. Program Continuity and Integrity

a. There should be a high probability that the program will continue in operation for at least three years as indicated by stated objectives and funding prospects.

b. The program components should have an expectation of stability and consistency to permit valid and reliable interpretation of their effects within the program.

c. As much as possible the program should be free from external and confounding influences that are not an inherent part of the program. If a program cannot meet this condition, then the external factors must lend themselves to explanation either in quantitative or qualitative terms so that they may be partialed out of the results.

d. The program should not be the subject of intensive study by other organizations nor should the students in the program be under intensive study by other organizations.

4. Program Cooperation and Support

a. The administrators of the program and the faculty and administration of the schools should be willing and able to cooperate significantly in the longitudinal study. This would be evidenced by a willingness to participate both in the coordination of data gathering and in the administration of tests and questionnaires.

b. The program and its cooperating schools should have, or be willing to set up, some system for providing specific information on changes in program components, such as the adding of grades, the hiring of new teachers, the purchase of additional equipment, or the introduction of administrative changes.

c. Information on which students are receiving which components of a program should be in existence or readily available. Provision should also be made for obtaining information on what other treatments the program students might be receiving outside of the specific program under study.

d. There should be a positive attitude toward participating in the longitudinal study on the part of district, county, state and other officials whose permission would be required.

e. Support for participating in the longitudinal study should come from the faculty and its teacher association or union, if appropriate. There should be a high probability of a favorable response from both the students and the community, or at least an absence of antagonism toward the idea of a longitudinal study.

APPENDIX III-A

Table of Items and Item Alternative Weights Used in the Computation of Student Questionnaire Scales

Scale Name	Abbrev.	Scale Items	Form A	Form B	Form C	Form D	Form E
Sex[2]	S-SEX	Sex	Item 1 Boy Girl	-	Item 1 Boy Girl	Item 1 Male Female	Item 1 Male Female
Ethnic Group[2]	S-ETH	Ethnic Group	Item 3 Oriental American Indian Black of Cuban, Mexican, or Puerto Rican descent White (other than of Cuban, Mexican, or Puerto Rican descent) Other	-	Item 3 Oriental American Indian Black of Cuban, Mexican or Puerto Rican descent White (other than of Cuban, Mexican, or Puerto Rican descent) Other	Item 3 Oriental American Indian Black of Cuban, Mexican, or Puerto Rican descent White (other than of Cuban, Mexican, or Puerto Rican descent) Other	Item 3 Oriental American Indian Black of Cuban, Mexican, or Puerto Rican descent White (other than of Cuban, Mexican, or Puerto Rican descent) Other
Age	S-AGE	Age	Item 2 9-9 or older 8-8 7-7 6-6 5-5 4-4 or younger	-	Item 2 12-12 or older 11-11 10-10 9-9 8-8 7-7 or younger	Item 2 15-15 or older 14-14 13-13 12-12 11-11 10-10 or younger	Item 2 19-19 or older 18-18 17-17 16-16 15-15 14-14 13-13 or younger
Socioeconomic Status	S-SES	Father's (or Head of Household's) Occupation	Item 6 4-Professional - such as teacher, doctor, engineer, lawyer, scientist, dentist, social worker, public accountant 3-Manager or business owner - such as store or office manager, banker, business owner, farm operator or owner, government official, military officer, real estate or insurance salesman 2-Skilled craftsman or foreman - such as carpenter, mechanic, plumber, electrician, factory foreman, policeman, draftsman, technician, beautician, seamstress, enlisted man in armed forces 2-Office worker or sales clerk - such as bank clerk, store clerk, bookkeeper, mail clerk, office worker, secretary 1-Workman or laborer - such as factory worker, cook, gardener, maid, bus driver, gas station attendant, farm worker, waiter, waitress 0-The father (or head of household) doesn't work 0-No information available	Item 4 4-Professional - such as teacher, doctor, engineer, lawyer, scientist, dentist, social worker, public accountant 3-Manager or business owner - such as store or office manager, banker, business owner, farm operator or owner, government official, military officer, real estate or insurance salesman 2-Skilled craftsman or foreman - such as carpenter, mechanic, plumber, electrician, factory foreman, policeman, draftsman, technician, beautician, seamstress, enlisted man in armed forces 2-Office worker or sales clerk - such as bank clerk, store clerk, bookkeeper, mail clerk, office worker, secretary 1-Workman or laborer - such as factory worker, cook, gardener, maid, bus driver, gas station attendant, farm worker, waiter, waitress 0-The father (or head of household) doesn't work 0-No information available	-	Item 5[3] 4-Professional - such as teacher, doctor, engineer, lawyer, scientist, dentist, social worker, public accountant 3-Manager or business owner - such as store or office manager, banker, business owner, farm operator or owner, government official, real estate or insurance salesman, military officer 2-Skilled craftsman or foreman - such as carpenter, mechanic, plumber, electrician, factory foreman, policeman, draftsman, technician, enlisted man in armed forces 2-Office worker or sales clerk - such as bank clerk, store clerk, bookkeeper, mail clerk, office worker 1-Workman or laborer - such as factory worker, gardener, bus driver, gas station attendant, farm worker, waiter 0-My father doesn't work 0-I don't have a father living at home 0-I don't know	Item 5[3] 4-Professional - such as teacher doctor, engineer, lawyer, scientist, dentist, social worker, public accountant 3-Manager or business owner - such as store or office manager, banker, business owner, farm operator or owner, government official, real estate or insurance salesman, military officer 2-Skilled craftsman or foreman - such as carpenter, mechanic, plumber, electrician, factory foreman, policeman, draftsman, technician, enlisted man in armed forces 2-Office worker or sales clerk - such as bank clerk, store clerk, bookkeeper, mail clerk, office worker 1-Workman or laborer - such as factory worker, gardener, bus driver, gas station attendant, farm worker, waiter 0-My father doesn't work 0-I don't have a father living at home 0-I don't know

[1] Item alternatives are not in the same sequential order as they were on the original data collection form. In this table they have been ordered in terms of the weight assigned to them, highest to lowest.

[2] Weights for item alternatives could not be assigned in the case of nominal/categorical items.

[3] As noted in the text of the report, when the student indicated, "My father doesn't work," the occupation of the student's head of household was obtained from the item on mother's occupation (item 6 on forms D and E).

Scale Name	Abbrev.	Scale Items	Form A	Form B	Form C	Form D	Form E
Socioeconomic Status	S-SES	Father's Education	Item 7 3-College 2-High school 1-Grade school 0-Doesn't currently have a male head of household 0-No information available	Item 1 3-College 2-High school 1-Grade school 0-Doesn't currently have a male head of household 0-No information available	-	Item 7 3-Some college (1-3 years) 3-Graduated from a 4-year college 2-Some high school 2-Graduated from high school 1-Grade school 0-I don't know	Item 7 3-Some college (1-3 years) 3-Graduated from a 4-year college 2-Some high school 2-Graduated from high school 1-Grade school 0-I don't know
		Mother's Education	Item 8 3-College 2-High school 1-Grade school 0-No information available	Item 2 3-College 2-High school 1-Grade school 0-No information available	-	Item 8 3-Some college (1-3 years) 3-Graduated from a 4-year college 2-Some high school 2-Graduated from high school 1-Grade school 0-I don't know	Item 8 3-Some college (1-3 years) 3-Graduated from a 4-year college 2-Some high school 2-Graduated from high school 1-Grade school 0-I don't know
Welfare Assistance	S-WA	Welfare Assistance	Item 5 2-No 1-Yes 0-No information available	Item 3 2-No 1-Yes 0-No information available	-	-	-
Reading Material Availability	S-RMA	Number of Books in Home	-	-	Item 15 5-Three or more bookcases full (250 or more) 4-Two bookcases full (100 to 249) 3-One bookcase full (25 to 99) 2-A few (10 to 24) 1-None or a very few (0 to 9)	Item 18 5-Three or more bookcases full (250 or more) 4-Two bookcases full (100 to 249) 3-One bookcase full (25 to 99) 2-A few (10 to 24) 1-None or a very few (0 to 9)	Item 18 5-Three or more bookcases full (250 or more) 4-Two bookcases full (100 to 249) 3-One bookcase full (25 to 99) 2-A few (10 to 24) 1-None or a very few (0 to 9)
		Daily Newspaper	-	-	Item 26 2-Yes 1-No	Item 33 2-Yes 1-No	Item 33 2-Yes 1-No
		Magazines in Home	-	-	Item 2[illegible] 5-7 or more 4-5 or 6 3-3 or 4 2-1 or 2 1-None	Item 34 5-7 or more 4-5 or 6 3-3 or 4 2-1 or 2 1-None	Item 34 5-7 or more 4-5 or 6 3-3 or 4 2-1 or 2 1-None
Family Structure/ Stability	S-FS/S	Child Resides with	Item 4 4-Both parents (real or adoptive) 3-Mother but not father 3-Father but not mother 2-Other relatives 1-Non-relatives 0-No information available	-	Item 4 4-Both parents 3-Mother but not father 3-Father but not mother 2-Other relatives 1-Non-relatives	Item 4 4-Both parents 3-Mother but not father 3-Father but not mother 2-Other relatives 1-Non-relatives	Item 4 4-Both parents 3-Mother but not father 3-Father but not mother 2-Other relatives 1-Non-relatives 0-No one
Parental Educational Expectations	S-PEE	How Far in School	-	-	Item 20 4-Graduate from a 4-year college 3-Some college (1-3 years) 2-Finish high school 1-They don't care	Item 23 4-Graduate from a 4-year college 3-Attend junior college, business or technical school for 1 or 2 years 2-Finish high school 1-They don't care	Item 23 4-Professional or graduate school after college 4-Graduate from a 4-year college 3-Attend junior college, business or technical school for 1 or 2 years 2-Finish high school 1-They don't care

III-A-3

Scale Name	Abbrev.	Scale Items	Form A	Form B	Form C	Form D	Form E
Parental Educational Expectations	S-PEE	Parents' Desire for Excellence	-	-	Item 25 4-One of the best 3-Above average 2-About average 1-They don't care	Item 31 4-One of the best 3-Above average 2-About average 1-They don't care	Item 31 4-One of the best 3-Above average 2-About average 1-They don't care
Attitude toward School	S-ATS	Likes School	-	-	Item 13 4-A lot 3-It's O.K. 2-Not much 1-I hate it	Item 16 4-A lot 3-It's O.K. 2-Not much 1-I hate it	Item 16 4-A lot 3-It's O.K. 2-Not much 1-I hate it
		Importance of Good Grades	-	-	Item 21 3-Very important to me 2-Important 1-Not very important	Item 24 3-Very important to me 2-Important 1-Not very important	Item 24 3-Very important to me 2-Important 1-Not very important
Attitude toward Language Arts	S-ATLA	Interest in English	-	-	Item 24 4-It's very interesting 3-It's usually interesting 2-It's sometimes interesting 1-It's boring	Item 30 4-It's very interesting 3-It's usually interesting 2-It's sometimes interesting 1-It's boring	Item 30 4-It's very interesting 3-It's usually interesting 2-It's sometimes interesting 1-It's boring
Reading Interest	S-RI	Number of Books Read	-	-	Item 7 6-More than 20 5-About 20 4-About 10 3-About 5 2-1 or 2 1-None	Item 10 6-More than 20 5-About 20 4-About 10 3-About 5 2-1 or 2 1-None	Item 10 6-More than 20 5-About 20 4-About 10 3-About 5 2-1 or 2 1-None
		Number of Library Visits	-	-	Item 16 5-Once a week or more 4-2 or 3 times a month 3-About once a month 2-A few times a year 1-Never	Item 19 5-Once a week or more 4-2 or 3 times a month 3-About once a month 2-A few times a year 1-Never	Item 19 5-Once a week or more 4-2 or 3 times a month 3-About once a month 2-A few times a year 1-Never
		Enjoy Reading	-	-	Item 18 3-Yes, a lot 2-It's O.K. 1-No	Item 21 3-Yes, a lot 2-It's O.K. 1-No	Item 21 3-Yes, a lot 2-It's O.K. 1-No
Attitude Toward Math	S-ATM	Interest in Math	-	-	Item 23 4-It's very interesting 3-It's usually interesting 2-It's sometimes interesting 1-It's boring	Item 29 4-It's very interesting 3-It's usually interesting 2-It's sometimes interesting 1-It's boring	Item 29 4[illegible]s very interesting 3-It's usually interesting 2-It's sometimes interesting 1-It's boring
Importance of School	S-IOS	Importance of Finishing School	-	-	-	Item 28 3-Very important 2-Important 1-Not very important	Item 28 3-Very important 2-Important 1-Not very important

Scale Name	Abbrev.	Scale Item	Form A	Form B	Form C	Form D	Form E
Importance of School	S-IOS	Feelings about Stopping School	-	-	-	Item 35 5-I'd do almost anything to stay in school 4-I'd try hard to continue 3-I would be disappointed 2-I wouldn't care one way or the other 1-Very happy -- I'd like to quit	Item 35 5-I'd do almost anything to stay in school 4-I'd try hard to continue 3-I would be disappointed 2-I wouldn't care one way or the other 1-Very happy -- I'd like to quit
Homework	S-H	Time Spent on on Homework	-	-	Item 6 4-About 2 hours or more a day 3-About 1 hour a day 2-About 1/2 hour a day 1-I have no homework 0-I have homework but don't do it	Item 11 5-3 hours or more a day 4-About 2 hours a day 3-About 1 hour a day 2-About 1/2 hour a day 1-I have no homework 0-I have homework but don't do it	Item 11 5-3 hours or more a day 4-About 2 hours a day 3-About 1 hour a day 2-About 1/2 hour a day 1-I have no homework 0-I have homework but don't do it
Social Facility	S-SF	Makes Friends Easily	Item 9 2-Yes 1-No 0-I am unable to say	Item 5 2-Yes 1-No 0-I am unable to say	-	-	-
		Social Aggressiveness	Item 10 2-Of average forcefulness 1-Aggressive 1-Passive 0-I am unable to say	Item 6 2-Of average forcefulness 1-Aggressive 1-Passive 0-I am unable to say			
		Confidence with Adults	Item 12 3-Very confident and self-assured 2-Moderately self-assured 1-Insecure 0-I am unable to say	Item 8 3-Very confident and self-assured 2-Moderately self-assured 1-Insecure 0-I am unable to say	-	-	-
Social Identity	S-SI	Liked by Classmates	-	-	Item 12 3-Yes 2-I don't know 1-No	Item 15 3-Yes 2-I don't know 1-No	Item 15 3-Yes 2-I don't know 1-No
		Makes Friends Easily	-	-	Item 14 3-Yes 2-Sometimes 1-No	Item 17 3-Yes 2-Sometimes 1-No	Item 17 3-Yes 2-Sometimes 1-No
		Friends Listen	-	-	Item 17 3-Almost always 2-Sometimes 1-Almost never	Item 20 3-Almost always 2-Sometimes 1-Almost never	Item 20 3-Almost always 2-Sometimes 1-Almost never
		Satisfaction with Self	-	-	Item 22 3-No 2-I'm not sure 1-Yes	Item 26 3-No 2-I'm not sure 1-Yes	Item 26 3-No 2-I'm not sure 1-Yes

APPENDIX III-B

Items and Item Alternative Weights Used in the Computation of Teacher Questionnaire Scales

Items and Item Alternative Weights Used in the Computation of Teacher Questionnaire Scales

Scale	Abbrev.	Scale Items	Alternatives
Age	T-AGE	Age	Item 17 24 - Under 26 30 - 26 to 35 40 - 36 to 45 50 - 46 to 55 60 - 56 to 65 68 - 66 or older
Teacher Socioeconomic Background	T-TSB	Father's Occupation	Item 4 4 - Professional - such as teacher, doctor, engineer, lawyer, scientist, dentist, social worker, public accountant 3 - Manager or business owner - such as store or office manager, banker, business owner, farm operator or owner, government official, military officer, real estate or insurance salesman 2 - Skilled craftsman or foreman - such as carpenter, mechanic, plumber, electrician, factory foreman, policeman, draftsman, technician, enlisted man in armed services 2 - Office worker or sales clerk - such as bank clerk, store clerk, bookkeeper, mail clerk, office worker 1 - Workman or laborer - such as factory worker, gardener, bus driver, gas station attendant, farm worker, waiter 0 - I don't know

(Continued)

Items and Item Alternative Weights Used
in the Computation of Teacher Questionnaire Scales
(Continued)

Scale	Abbrev.	Scale Items	Alternatives
		Father's Education	Item 5 5 - Graduated from a 4-year college 4 - Some college (1-3 years) 3 - Graduated from high school 2 - Some high school 1 - Grade school 0 - I don't know
		Mother's Education	Item 6 5 - Graduated from a 4-year college 4 - Some college (1-3 years) 3 - Graduated from high school 2 - Some high school 1 - Grade school 0 - I don't know
Type of Undergraduate Institution	T-TUI	Type of Institution	Item 8 2 - Public - university, college, or technological institution 2 - Private - university, college, or technological institution 1 - Public - normal school, teachers college, junior college, or similar public institution 1 - Private - normal school, teachers college, junior college, or similar private institution

(Continued)

Items and Item Alternative Weights Used in the Computation of Teacher Questionnaire Scales (Continued)

Scale	Abbrev.	Scale Items	Alternatives
		Highest Degree Offered	Item 10 5 - Doctor's degree 4 - Master's degree 3 - Professional or specialist diploma (sixth year) 2 - Bachelor's degree 1 - Certificate only
Undergraduate Major - English	T-UME	Undergraduate Major	Item 7 1 - Elementary Education 1 - English or Journalism 0 - Mathematics 0 - I did not go to college (Skip to Question 13.) 0 - Business-Commercial 0 - Foreign Language 0 - Home Economics 0 - Industrial Arts 0 - Music-Art 0 - Physical Education-Health 0 - Biological or Physical Science 0 - Social Science, including History 0 - Other

(Continued)

Items and Item Alternative Weights Used in the Computation of Teacher Questionnaire Scales

(Continued)

III-B-4

Scale	Abbrev.	Scale Items	Alternatives
Undergraduate Major-Mathematics	T-UMM	Undergraduate Major	Item 7
			1 - Elementary
			0 - English or Journalism
			1 - Mathematics
			0 - I did not go to college (Skip to Question 13.)
			0 - Business-Commercial
			0 - Foreign Language
			0 - Home Economics
			0 - Industrial Arts
			0 - Music-Art
			0 - Physical Education-Health
			0 - Biological or Physical Science
			0 - Social Science, including History
			0 - Other
Teaching Qualifications	T-TQ	Highest Degree	Item 15
			4 - A master's degree or higher
			3 - A bachelor's degree
			2 - A degree or diploma based on less than 4 years of work
			1 - No degree
		Years Teaching Experience	Item 19
			9 - 30 or more
			8 - 20-29
			7 - 10-19
			6 - 5-9
			5 - 4
			4 - 3
			3 - 2
			2 - 1
			1 - None

(Continued)

Items and Item Alternative Weights Used in the Computation of Teacher Questionnaire Scales (Continued)

Scale	Abbrev.	Scale Items	Alternatives
			Item 20
		Years in Present School	8 - 30th year or more
			7 - 20th to 29th year
			6 - 10th to 19th year
			5 - 5th to 9th year
			4 - 4th year
			3 - 3rd year
			2 - 2nd year
			1 - 1st year
		Certification	Item 21
			4 - The highest certification offered in this state (such as life, permanent, or long-term)
			3 - Regular certification but less than the highest certification in this state
			2 - Temporary, provisional, or emergency certification
			1 - Noncertified

(Continued)

Items and Item Alternative Weights Used in the Computation of Teacher Questionnaire Scales (Continued)

Scale	Abbrev.	Scale Items	Alternatives
		Employment Status	Item 26 5 - I have achieved tenure on a continuing contract basis. 4 - I have a regular full-time appointment, but I do not have tenure. 3 - I am a substitute teacher 2 - I am an intern teacher or in the Teacher Corps. 1 - Other (such as teacher aide, hourly consultant, etc.)
Teacher Associations or Union Participation	T-TAUP	Professional Associations Participation	Item 33 3 - Yes, I am an active worker 2 - Yes, I am a member but not an active worker 1 - No
Current Professional Reading	T-CPR	Reads Journals	Item 34 4 - Yes, 3 or more regularly 3 - Yes, 2 regularly 2 - Yes, 1 regularly 1 - No, not regularly

(Continued)

Items and Item Alternative Weights Used in the Computation of Teacher Questionnaire Scales
(Continued)

Scale	Abbrev.	Scale Items	Alternatives
School Reputation	T-SR	School Preference	Item 27 5 - Definitely not 4 - Probably not 3 - I am undecided 2 - Probably yes 1 - Definitely yes
		School Reputation	Item 28 5 - Among the very best 4 - Better than average 3 - About average 2 - Below average 1 - A poor school 0 - I don't know
		Opinion of School	Item 29 5 - Among the very best 4 - Better than average 3 - About average 2 - Below average 1 - A poor school 0 - I am undecided

(Continued)

Items and Item Alternative Weights Used in the Computation of Teacher Questionnaire Scales
(Continued)

Scale	Abbrev.	Scale Items	Alternatives
Class Size	T-CS	Average Class Size	Item 36 7 - 35 or more 6 - 30 to 34 5 - 25 to 29 4 - 20 to 24 3 - 15 to 19 2 - 10 to 14 1 - Fewer than 10
Administrative Support	T-AS	Sufficient School Leadership	Item 32G 2 - Disagree 1 - Agree
		Class Interruptions	Item 32L 2 - Disagree 1 - Agree
		Non-Teaching Tasks	Item 320 2 - Disagree 1 - Agree

APPENDIX III-C

Means and Standard Deviations of Student Questionnaire Scale Items (by Year and by Form)

Means and Standard Deviations of Student Questionnaire Scale Items (by Year and by Form)

			Data Collection Form									
		School	Form A		Form B		Form C		Form D		Form E	
Scale (Abbrev.)	Scale Items	Year	M	SD	M	SD	M	SD	M	SD	M	SD
Socioeconomic Status (S-SES)	Head of Household's Occupation	1970-71	2.52	1.03	2.35	1.07	-	-	2.33	1.02	2.39	0.99
		1971-72	2.40	1.01	2.35	1.05	-	-	2.39	1.01	2.40	1.00
		1972-73	2.45	1.04	2.43	1.04	-	-	2.48	1.01	2.42	0.99
	Father's Education	1970-71	2.50	0.58	2.28	0.65	-	-	2.44	0.59	2.35	0.59
		1971-72	2.45	0.55	2.37	0.61	-	-	2.46	0.59	2.39	0.59
		1972-73	2.52	0.55	2.41	0.59	-	-	2.52	0.58	2.38	0.59
	Mother's Education	1970-71	2.37	0.58	2.18	0.59	-	-	2.35	0.56	2.32	0.52
		1971-72	2.33	0.53	2.26	0.58	-	-	2.40	0.54	2.33	0.54
		1972-73	2.40	0.56	2.30	0.55	-	-	2.46	0.54	2.32	0.54
Welfare Assistance (S-WA)	Welfare Assistance	1970-71	1.93	0.24	1.92	0.27	-	-	-	-	-	-
		1971-72	1.92	0.27	1.93	0.26	-	-	-	-	-	-
		1972-73	1.91	0.28	1.93	0.26	-	-	-	-	-	-
Reading Material Availability (S-RMA)	Number of Books in Home	1970-71	-	-	-	-	3.75	1.16	3.76	1.11	3.77	1.11
		1971-72	-	-	-	-	3.91	1.13	3.88	1.10	3.84	1.07
		1972-73	-	-	-	-	3.93	1.12	3.95	1.06	3.84	1.08
	Daily Newspaper	1970-71	-	-	-	-	1.81	0.39	1.86	0.35	1.91	0.28
		1971-72	-	-	-	-	1.83	0.38	1.86	0.34	1.90	0.30
		1972-73	-	-	-	-	1.81	0.39	1.87	0.34	1.89	0.31
	Magazines in Home	1970-71	-	-	-	-	3.52	1.37	3.22	1.24	3.04	1.16
		1971-72	-	-	-	-	3.61	1.34	3.28	1.25	3.15	1.13
		1972-73	-	-	-	-	3.52	1.34	3.27	1.22	3.06	1.13

(continued)

Means and Standard Deviations
of Student Questionnaire Scale Items
(by Year and by Form) continued

			Data Collection Form									
		School	Form A		Form B		Form C		Form D		Form E	
Scale (Abbrev.)	Scale Items	Year	M	SD	M	SD	M	SD	M	SD	M	SD
Family Structure/Stability (S-FS/S)	Child Resides With	1970-71	3.85	0.39	-	-	3.82	0.43	3.80	0.46	3.79	0.49
		1971-72	3.84	0.40	-	-	3.85	0.39	3.80	0.45	3.76	0.51
		1972-73	3.83	0.40	-	-	3.86	0.37	3.80	0.45	3.75	0.53
Parental Educational Expectations (S-PEE)	How Far in School	1970-71	-	-	-	-	3.46	0.86	3.46	0.81	3.29	0.85
		1971-72	-	-	-	-	3.49	0.82	3.39	0.85	3.21	0.87
		1972-73	-	-	-	-	3.48	0.83	3.42	0.84	3.18	0.88
	Parents' Desire for Excellence	1970-71	-	-	-	-	3.60	0.66	3.32	0.72	3.21	0.75
		1971-72	-	-	-	-	3.59	0.65	3.32	0.72	3.25	0.74
		1972-73	-	-	-	-	3.57	0.67	3.32	0.71	3.23	0.76
Attitude toward School (S-ATS)	Likes School	1970-71	-	-	-	-	3.15	0.96	3.03	0.80	2.98	0.77
		1971-72	-	-	-	-	3.08	0.93	2.97	0.82	2.93	0.77
		1972-73	-	-	-	-	3.10	0.93	2.96	0.80	2.95	0.76
	Importance of Good Grades	1970-71	-	-	-	-	2.79	0.46	2.62	0.55	2.29	0.61
		1971-72	-	-	-	-	2.80	0.45	2.57	0.57	2.28	0.62
		1972-73	-	-	-	-	2.78	0.47	2.57	0.57	2.30	0.62
Attitude toward Language Arts (S-ATLA)	Interest in English	1970-71	-	-	-	-	2.84	1.09	2.58	0.96	2.44	0.94
		1971-72	-	-	-	-	2.74	1.07	2.51	0.97	2.50	0.95
		1972-73	-	-	-	-	2.69	1.07	2.55	0.95	2.54	0.94

(continued)

Means and Standard Deviations of Student Questionnaire Scale Items (by Year and by Form) continued

			Data Collection Form									
		School	Form A		Form B		Form C		Form D		Form E	
Scale (Abbrev.)	Scale Items	Year	M	SD	M	SD	M	SD	M	SD	M	SD
Reading Interest (S-RI)	Number of Books Read	1970-71	-	-	-	-	4.13	1.43	3.49	1.43	3.16	1.42
		1971-72	-	-	-	-	4.13	1.43	3.43	1.46	2.90	1.39
		1972-73	-	-	-	-	4.04	1.41	3.51	1.45	2.93	1.37
	Number of Library Visits	1970-71	-	-	-	-	2.66	1.43	2.48	1.24	2.39	1.14
		1971-72	-	-	-	-	2.67	1.42	2.48	1.24	2.31	1.12
		1972-73	-	-	-	-	2.65	1.37	2.53	1.23	2.34	1.11
	Enjoy Reading	1970-71	-	-	-	-	2.51	0.63	2.33	0.66	2.27	0.68
		1971-72	-	-	-	-	2.49	0.63	2.29	0.67	2.24	0.69
		1972-73	-	-	-	-	2.48	0.63	2.30	0.55	2.25	0.68
Attitude toward Math (S-ATM)	Interest in Math	1970-71	-	-	-	-	2.91	1.11	2.64	1.02	2.27	1.01
		1971-72	-	-	-	-	2.86	1.10	2.54	1.01	2.28	1.01
		1972-73	-	-	-	-	2.79	1.10	2.53	0.99	2.32	1.00
Importance of School (S-IOS)	Importance of Finishing School	1970-71	-	-	-	-	-	-	2.76	0.50	2.72	0.53
		1971-72	-	-	-	-	-	-	2.71	0.53	2.71	0.53
		1972-73	-	-	-	-	-	-	2.72	0.51	2.72	0.52
	Feelings about Stopping School	1970-71	-	-	-	-	-	-	4.06	1.02	4.04	0.99
		1971-72	-	-	-	-	-	-	3.88	1.10	4.01	1.03
		1972-73	-	-	-	-	-	-	3.85	1.08	4.04	0.98
Homework (S-H)	Time Spent on Homework	1970-71	-	-	-	-	2.18	0.89	2.48	1.02	2.48	1.03
		1971-72	-	-	-	-	2.25	0.85	2.30	0.97	2.46	1.02
		1972-73	-	-	-	-	2.16	0.88	2.41	0.96	2.54	1.03

(continued)

Means and Standard Deviations
of Student Questionnaire Scale Items
(by Year and by Form) continued

			Data Collection Fo									
		School	Form A		Form B		Form C		Form D		Form E	
Scale (Abbrev.)	Scale Items	Year	M	SD	M	SD	M	SD	M	SD	M	SD
Social Facility (S-SF)	Makes Friends Easily	1970-71	1.79	0.40	1.73	0.44	-	-	-	-	-	-
		1971-72	1.77	0.42	1.73	0.44	-	-	-	-	-	-
		1972-73	1.78	0.41	1.74	0.44	-	-	-	-	-	-
	Social Aggressiveness	1970-71	1.58	0.49	1.56	0.50	-	-	-	-	-	-
		1971-72	1.56	0.50	1.58	0.49	-	-	-	-	-	-
		1972-73	1.58	0.49	1.57	0.49	-	-	-	-	-	-
	Confidence with Adults	1970-71	2.05	0.65	2.02	0.64	-	-	-	-	-	-
		1971-72	2.07	0.65	2.01	0.63	-	-	-	-	-	-
		1972-73	2.06	0.65	2.02	0.62	-	-	-	-	-	-
Social Identity (S-SI)	Liked by Classmates	1970-71	-	-	-	-	2.47	0.66	2.64	0.55	2.68	0.50
		1971-72	-	-	-	-	2.50	0.65	2.63	0.56	2.69	0.51
		1972-73	-	-	-	-	2.52	0.65	2.65	0.55	2.69	0.50
	Makes Friends Easily	1970-71	-	-	-	-	2.31	0.64	2.44	0.58	2.45	0.59
		1971-72	-	-	-	-	2.32	0.63	2.44	0.57	2.46	0.58
		1972-73	-	-	-	-	2.35	0.62	2.45	0.58	2.50	0.57
	Friends Listen	1970-71	-	-	-	-	2.27	0.62	2.46	0.56	2.57	0.53
		1971-72	-	-	-	-	2.31	0.61	2.46	0.56	2.57	0.52
		1972-73	-	-	-	-	2.35	0.59	2.48	0.55	2.58	0.52
	Satisfaction With Self	1970-71	-	-	-	-	2.13	0.80	2.23	0.80	2.34	0.78
		1971-72	-	-	-	-	2.17	0.80	2.29	0.79	2.43	0.76
		1972-73	-	-	-	-	2.27	0.79	2.40	0.76	2.51	0.73

APPENDIX III-D

Number of Students Completing Student Questionnaire Scale Items (by Year and by Form)

Number of Students Completing Student Questionnaire Scale Items (by Year and by Form)

Scale (Abbrev.)	*Scale Items*	School Year	Form A	Form B	Form C	Form D	Form E
Socioeconomic Status (S-SES)	Head of Household's Occupation	1970-71	1651	6129	-	5767	2455
		1971-72	1744	5335	-	5141	3989
		1972-73	777	3950	-	6718	5999
	Father's Education	1970-71	1333	5377	-	4193	2147
		1971-72	1573	4901	-	3912	3744
		1972-73	678	3661	-	5363	5738
	Mother's Education	1970-71	1336	5544	-	4550	2318
		1971-72	1662	5244	-	4237	3986
		1972-73	719	3839	-	5648	6065
Welfare Assistance (S-WA)	Welfare Assistance	1970-71	1629	6108	-	-	-
		1971-72	1889	5455	-	-	-
		1972-73	876	4015	-	-	-
Reading Material Availability (S-RMA)	Number of Books in Home	1970-71	-	-	6964	6443	2668
		1971-72	-	-	5159	5783	4494
		1972-73	-	-	3627	7546	6787
	Daily Newspaper	1970-71	-	-	6963	6424	2642
		1971-72	-	-	5146	5774	4426
		1972-73	-	-	3618	7513	6635
	Magazines in Home	1970-71	-	-	6960	6426	2639
		1971-72	-	-	5147	5773	4491
		1972-73	-	-	3623	7516	6717

(continued)

Number of Students Completing
Student Questionnaire Scale Items
(by Year and by Form) continued

Scale (Abbrev.)	Scale Items	School Year	Form A	Form B	Form C	Form D	Form E
Family Structure/ Stability (S-FS/S)	Child Resides with	1970-71	1982	-	6954	6455	2667
		1971-72	2049	-	5157	5742	4493
		1972-73	941	-	3628	7452	6794
Parental Educational Expectations (S-PEE)	How Far in School	1970-71	-	-	6956	6431	2191
		1971-72	-	-	5144	5767	3757
		1972-73	-	-	3624	7484	5714
	Parents' Desire for Excellence	1970-71	-	-	6961	6420	2637
		1971-72	-	-	5150	5770	4485
		1972-73	-	-	3620	7506	6720
Attitude Toward School (S-ATS)	Likes School	1970-71	-	-	6968	6448	2664
		1971-72	-	-	5155	5783	4500
		1972-73	-	-	3628	7544	6808
	Importance of Good Grades	1970-71	-	-	6967	6439	2655
		1971-72	-	-	5149	5770	4495
		1972-73	-	-	3619	7521	6783
Attitude Toward Language Arts (S-ATLA)	Interest in English	1970-71	-	-	6965	6428	2643
		1971-72	-	-	5152	5777	4491
		1972-73	-	-	3621	7528	6741

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(continued)

Number of Students Completing
Student Questionnaire Scale Items
(by Year and by Form) continued

Scale (Abbrev.)	Scale Items	School Year	Form A	Form B	Form C	Form D	Form E
Reading Interest (S-RI)	Number of Books Read	1970-71	-	-	6973	6398	2643
		1971-72	-	-	5162	5784	4501
		1972-73	-	-	3631	7526	6822
	Number of Library Visits	1970-71	-	-	6967	6450	2670
		1971-72	-	-	5157	5777	4504
		1972-73	-	-	3626	7530	6798
	Enjoy Reading	1970-71	-	-	6965	6446	2665
		1971-72	-	-	5145	5776	4504
		1972-73	-	-	3616	7525	6797
Attitude Toward Math (S-ATM)	Interest in Math	1970-71	-	-	6962	6428	2643
		1971-72	-	-	5145	5763	4494
		1972-73	-	-	3618	7520	6742
Importance of School (S-IOS)	Importance of Finishing School	1970-71	-	-	-	6414	2645
		1971-72	-	-	-	5772	4491
		1972-73	-	-	-	7506	6741
	Feelings About Stopping School	1970-71	-	-	-	6399	2634
		1971-72	-	-	-	5773	4483
		1972-73	-	-	-	7514	6703
Homework (S-H)	Time Spent on Homework	1970-71	-	-	6753	6134	2428
		1971-72	-	-	5010	5524	4082
		1972-73	-	-	3528	7248	6302

(continued)

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Number of Students Completing
Student Questionnaire Scale Items
(by Year and by Form) continued

Scale (Abbrev.)	Scale Items	School Year	Form A	Form B	Form C	Form D	Form E
Social Facility (S-SF)	Makes Friends Easily	1970-71	1919	6673	-	-	-
		1971-72	2008	5839	-	-	-
		1972-73	927	4198	-	-	-
	Social Aggressiveness	1970-71	1961	6926	-	-	-
		1971-72	2060	6000	-	-	-
		1972-73	942	4358	-	-	-
	Confidence with Adults	1970-71	1912	6888	-	-	-
		1971-72	2038	5959	-	-	-
		1972-73	940	4324	-	-	-
Social Identity (S-SI)	Liked by Classmates	1970-71	-	-	6971	6443	2662
		1971-72	-	-	5151	5766	4481
		1972-73	-	-	3626	7512	6787
	Makes Friends Easily	1970-71	-	-	6968	6442	2661
		1971-72	-	-	5158	5758	4494
		1972-73	-	-	3628	7510	6783
	Friends Listen	1970-71	-	-	6966	6441	2661
		1971-72	-	-	5153	5766	4490
		1972-73	-	-	3624	7502	6774

(continued)

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Number of Students Completing Student Questionnaire Scale Items (by Year and by Form) continued

Scale (Abbrev.)	Scale Items	School Year	Form A	Form B	Form C	Form D	Form E
Social Identity (S-SI) continued	Satisfaction with Self	1970-71	-	-	6968	6429	2644
		1971-72	-	-	5147	5761	4479
		1972-73	-	-	3620	7474	6742
TOTAL NUMBER OF STUDENTS		1970-71	2004	7147	7147	6482	2679
		1971-72	2075	6115	6115	5804	4550
		1972-73	946	4497	4497	7568	6848

APPENDIX III-E

Means, Standard Deviations and n's of Teacher Questionnaire Scale Items

Means, Standard Deviations and n's of Teacher Questionnaire Scale Items (By Year)

Scale (Abbrev.)	Scale Items	School Year	Means	Standard Deviation	n's
Age (T-AGE)	Age	1970-71	36.98	11.46	858
		1971-72	36.13	10.84	778
		1972-73	36.82	10.48	881
Teacher Socioeconomic Background (T-TSB)	Father's Occupation	1970-71	2.48	0.98	851
		1971-72	2.49	1.01	764
		1972-73	2.51	0.99	859
	Father's Education	1970-71	2.72	1.48	828
		1971-72	2.84	1.48	745
		1972-73	2.84	1.47	841
	Mother's Education	1970-71	2.89	1.31	837
		1971-72	2.96	1.29	755
		1972-73	2.89	1.48	859
Type of Undergraduate Institution (T-TUI)	Type of Institution	1970-71	1.81	0.40	844
		1971-72	1.83	0.38	771
		1972-73	1.85	0.35	870
	Highest Degree Offered	1970-71	3.81	1.14	844
		1971-72	3.89	1.15	772
		1972-73	3.89	1.17	873
Undergraduate Major-English (T-UME)	Undergraduate Major	1970-71	0.53	0.50	836
		1971-72	0.52	0.50	768
		1972-73	0.44	0.50	858
Undergraduate Major-Mathematics (T-UMM)	Undergraduate Major	1970-71	0.45	0.50	836
		1971-72	0.46	0.50	768
		1972-73	0.39	0.49	858

(continued)

Means, Standard Deviations and n's of Teacher Questionnaire Scale Items (By Year) (continued)

Scale (Abbrev.)	Scale Items	School Year	Means	Standard Deviation	n's
Teaching Qualifications (T-TQ)	Highest Degree	1970-71	3.17	0.60	852
		1971-72	3.24	0.53	781
		1972-73	3.27	0.54	883
	Years of Teaching Experience	1970-71	5.40	2.22	849
		1971-72	5.58	2.03	780
		1972-73	5.63	2.00	883
	Years in Present School	1970-71	3.20	1.83	848
		1971-72	3.48	1.81	779
		1972-73	3.68	1.80	883
	Certification	1970-71	3.26	0.81	840
		1971-72	3.28	0.73	777
		1972-73	3.34	0.72	876
	Employment Status	1970-71	4.35	0.86	850
		1971-72	4.48	0.74	781
		1972-73	4.49	0.78	876
Current Professional Reading (T-CPR)	Reads Journals	1970-71	2.12	1.01	854
		1971-72	2.18	0.98	781
		1972-73	2.16	1.04	882
Teacher Associations or Union Participation (T-TAUP)	Professional Associations Participation	1970-71	2.07	0.63	852
		1971-72	2.07	0.59	781
		1972-73	2.05	0.60	884

(continued)

Means, Standard Deviations and n's of Teacher Questionnaire Scale Items (By Year) (continued)

Scale (Abbrev.)	Scale Items	School Year	Means	Standard Deviation	n's
School Reputation (T-SR)	School Preference	1970-71	4.09	0.95	851
		1971-72	4.04	1.05	779
		1972-73	4.08	1.00	881
	School Reputation	1970-71	3.74	1.16	762
		1971-72	3.80	1.15	701
		1972-73	3.81	1.13	797
	Opinion of School	1970-71	3.98	0.96	791
		1971-72	4.12	0.89	760
		1972-73	4.09	0.89	871
Class Size (T-CS)	Average Class Size	1970-71	5.08	1.47	828
		1971-72	5.18	1.31	775
		1972-73	5.21	1.17	874
Administrative Support (T-AS)	Sufficient School Leadership	1970-71	1.75	0.43	821
		1971-72	1.70	0.46	767
		1972-73	1.73	0.44	869
	Class Interruptions	1970-71	1.74	0.44	827
		1971-72	1.65	0.48	774
		1972-73	1.62	0.48	877
	Non-Teaching Tasks	1970-71	1.56	0.50	830
		1971-72	1.47	0.50	778
		1972-73	1.50	0.50	877
Total Number of Teachers per Year*		1970-71			858
		1971-72			783
		1972-73			885

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*1508 different teachers completed questionnaires during one or more years of the study.

APPENDIX III-F

Verification of the Project LONGSTEP Questionnaire Data

VERIFICATION OF THE PROJECT LONGSTEP QUESTIONNAIRE DATA[1]

During the second year of Project LONGSTEP, we undertook two studies to gauge the dependability of data from our questionnaires. One concerned student and teacher reports (in Questionnaires C, D or E, by students; or, in A or B, by teachers) of students' home backgrounds; the other, teacher assessment of the student. They involved subtle differences in rationales. For the first, respective parents' answers could serve as checks on students or on teachers, thus in each case with two independent sources of inaccuracy (student and parent, or teacher and parent). For the second, teachers were to repeat selected items about two months after the first administration; here discrepancies result either from teacher unreliability or from real student change.

Two sampling procedures were involved: a random sample of two percent of all students in the study in 1971-72, and a selected sample of items drawn from a wide range of scales used. We aimed at using a small number of items common to all levels of questionnaires. For the parent verification, items were selected so that each could reasonably be answered by both student and parent. There were two parent verification questionnaire forms which were parallel to the different types of student forms. The student Form A, which requested background information about first and second grade pupils, was originally filled out by their teachers because of the children's limited reading ability. Verification Form A, sent to parents of first and second grade students, contained seven questions. Verification Form B-E, sent to parents of third through ninth grade students, who had filled out their own student questionnaire forms, included the same questions as verification Form A, with five additional questions.

For the verification of teacher reports on students, seven items related to teacher evaluation of students were selected from the teacher-completed student questionnaire. These items were different from other items of this instrument which were related to background-type information about the student and which were included in the parent verification instrument.

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[1] Adapted from Roberts, A.O.H. & Roberts, S. J. Verification of the Longitudinal Study Questionnaire Data, Memorandum report. Palo Alto, California: American Institutes for Research, January 1973.

Using random number tables, a 2% student sample was selected from each grade level in each school participating in Project LONGSTEP. Three hundred forty-two students were selected. Names, addresses and telephone numbers of parents or guardians were obtained from school principals during site visits conducted in spring, 1972. Teachers of students in grades 1 through 5 were obtained from school and project data files.

The parent verification questionnaires, including an explanatory letter and directions on the first page, were mailed with a stamped, addressed envelope for returning the completed forms. Reminder letters were also prepared, to be sent to non-respondents. All letters were designed to be brief but persuasive, to acquaint the parents with the purpose of the study and encourage them to reply. As an incentive for the return of completed questionnaires, a new Eisenhower dollar in a plastic display container was to be mailed to each respondent. Copies of the questionnaires and reminder letters are included in Attachments 1 through 6.

The procedures used for mailing questionnaires and recording responses were designed from past experience with mail surveys, which had shown that a period of two weeks was sufficient for responses to reach a peak, decline, and virtually cease. At this point, some sort of reminder needed to be sent. Accordingly, the mailings to parents were planned for cycles of about two weeks, and were carried out as follows:

- All parents in the sample were sent the questionnaire, which included the explanatory letter and directions on its first page, accompanied by a prepaid return envelope and a slip for specifying the address to which the dollar was to be sent.
- Two weeks after the questionnaire had been sent, a first reminder letter was sent to all non-respondents, along with a second copy of the questionnaire.

- Two weeks after the first reminder, a second reminder was mailed to all remaining non-respondents. All reminders included an additional copy of the questionnaire and a prepaid return envelope.
- Two weeks after the second reminder, non-respondents were contacted by telephone. Phone calls were made at different times throughout the day, and continued over several days until every parent with a telephone had been contacted and had either answered or refused to answer the questionnaire. Non-respondents who did not have telephones were outside the scope of this fourth appeal.

There were two mailings of parent verification questionnaires, about six weeks apart. This was done because the student questionnaires were administered at different times in different schools, from March 10 up through May 19, 1972. Mailing #1 included seven sites sent questionnaires on April 12 and one site mailed on April 17, a total of 143 questionnaires. Mailing #2, to the four remaining sites, took place on May 25, and involved 200 questionnaires.

The mailing procedures which have already been described were followed for both mailings, with one exception in Mailing #2. This mailing had a much poorer rate of returns in response to the original questionnaire and the first reminder, and it was decided that a third reminder letter should be sent in the hope of obtaining more replies before beginning the phone calls. Thus Mailing #2 had five response waves; Mailing #1 had four.

In both mailings, phone calls were begun when the number of non-respondents remaining had reduced to approximately 14 percent of the total number of questionnaires originally sent. All remaining non-respondents to the mailed questionnaires were contacted by telephone, except for those six who had no phone, and two who could never be reached. Attempts were made every day to contact each parent on the list of non-respondents, and parents were checked off the list as they answered. Whenever someone other than the parent answered, callers tried to get information on where and when the parent could be reached. Where no one answered the phone at all, at least one other attempt was made later in the day. The two parents who could never be reached, after daily morning and evening attempts had gone on for two weeks, were finally counted as non-respondents. In addition to following a pattern of daily repeated attempts, the telephone callers followed the specific guidelines established for use by staff members during telephone interviews. Table III-F-1 presents the response rates and total return for the parent verification questionnaires. Of the 134 teacher verification questionnaires mailed, 133 were returned.

It is tempting at first sight to regard the parent verification and teacher verification as reliability studies and to use some such device as the Spearman Brown prediction formula to devise estimates of scale reliability coefficients. For the teacher verification questionnaire this is possible, with the reservation that real change in students will be interpreted as error variance. For the parent verification, since we have "uncorrelated" groups (parents and students, or parents and teachers), we would, strictly speaking, need to square the correlation between the two to convert it to a reliability coefficient. Rather than try to produce reliability coefficients, however, we will report correlations for items separately, with interpretations supplemental to, rather than substitutes for, such coefficients. This will leave us free to use contingency coefficients for nominal measures (e.g., ethnic group); in addition, we can use this coefficient and a coefficient of agreement for all items in addition to the correlation coefficient for the sake of the new light they throw on the relationships. The three coefficients and their interpretations are discussed below.

The Contingency Coefficient, C

On the one hand, C is appropriate only as a measure of association; its value will increase whenever there is bias or any systematic disagreement between students and parents; and it is therefore not a measure of agreement--although high agreement will also cause high C's. On the other hand, the only options one has for nominal measures are C and the coefficient of agreement, K, which has its own limitations as will be seen, in the next section.

TABLE III-F-1

Response Rates for Parent Verification Questionnaires

Site Location	Sent	Replies to Questionnaire (First Wave)		Replies to 1st Reminder (Second Wave)		Replies to 2nd Reminder (Third Wave)		Replies to 3rd Reminder (Fourth Wave)		Replies to Phone Call (Fifth Wave)		Total Return		Non-Respondents: Phoned, refused to answer	No Answer	No Phone
(Mailing #1)		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)			
Pennsylvania	33	18	(55)	5	(15)	4	(12)	--	---	4	(12)	31	(94)	1	0	1
California	16	13	(81)	0	(0)	0	(0)	--	---	2	(13)	15	(94)	1	0	0
Utah	39	22	(56)	10	(28)	1	(3)	--	---	3	(8)	37	(95)	2	0	1
Texas	31	19	(61)	5	(16)	2	(6)	--	---	4	(13)	30	(97)	0	0	1
Wisconsin*	24	16	(67)	3	(13)	2	(8)	--	---	2	(8)	23	(96)	1	0	0
Total	143	88	(62)	24	(17)	9	(6)	--	---	15	(10)	136	(95)	4	0	3
(Mailing #2)																
Minnesota	66	36	(55)	11	(17)	6	(9)	3	(5)	6	(9)	63	(95)	3	0	1
California	26	13	(50)	5	(19)	3	(12)	1	(4)	4	(15)	26	(100)	0	0	0
Kentucky	41	18	(44)	12	(29)	2	(5)	3	(7)	3	(7)	38	(93)	1	1	1
Florida	66	40	(61)	12	(18)	4	(6)	2	(3)	5	(8)	63	(95)	1	1	1
Total	199	107	(54)	40	(20)	15	(8)	9	(5)	18	(9)	190	(95)	5	2	3

*Wisconsin included four sites/districts.

C's upper limit is dependent upon the size of the table, being .816 for a 3 X 3 table, .866 for a 4 X 4, and .894 for one of 5 X 5. Thus a C of .68 from a 3 X 3 table would be about .83 if the ceiling were unity.

Coefficient of Agreement, K

This coefficient was devised by Jacob Cohen (see Educational and Psychological Measurement, 1960, 20, 37-46). It is similar to C in that it takes chance agreement into account by computing expected frequencies. It can be interpreted as the proportion of agreement between two judges when chance agreement has been excluded. It can be applied to nominal measures or better. However, it concentrates on the main diagonal of the table and is reduced by any reduction of frequencies in this diagonal. Thus, if there were a systematic bias between student and parent, then one could find a K of zero even though C and r were high. This can be turned to advantage as will be seen. K is not affected by "coarse grouping" and always has a ceiling of unity. A high K always indicates a correlation coefficient at least as high as K, if not higher.

Product-Moment Correlation

In the extreme case of a 2 X 2 table, this is synonymous with the phi-coefficient, but whatever the size of the table, values are depressed by the "coarse grouping" effect, though in a more complex fashion than is C; so once again, a value of .8 for a 3 X 3 table can be regarded as higher than its face value.

Correlation is a measure of association, not agreement; and so systematic biases between responses from students and parents show little or no effect. For example, if each student gave Father's Education as one category higher than claimed by his parent, we would get high correlation and contingency coefficients, but a near zero coefficient of agreement.

Before dealing with Table III-F-2, which presents the verification coefficients (student/parent), note that since the null hypothesis is inappropriate in this context, significances have not been tested;

Table III-F-2

Verification Coefficients
Student/Parent

Item No.[a]	Item Description	Item used in questionnaire forms	C	C corrected [c]	K	r or ϕ	N
1	Student's Race	C,D,E	.83[b]	.71	.63	.69	294
2	Child resides with	C,D,E	.84[b]	.75	.85	(N.A.)	297
3	Father's education	D,E	.68	.84	.68	.79	147
4	Mother's education	D,E	.71	.84	.75	.80	155
5	Attended kindergarten	C,D,E	.63	.89	.82	.82	296
6	Father's employment	D,E	.81[b]	.88	.59	.70	164
7	Library visits	C,D,E	.53	.59	.25	.44	298
8	How far in school	C,D,E	.54	.62	.43	.54	292
9	School discussions with parents	C,D,E	.20	.24	.07	-.05	298
10	How good a student	C,D,E	.21[b]	.24	.08	.12	294
11	How many magazines	C,D,E	.47	.53	.20	.43	297

[a] Numbers in these tables are not from questionnaires, but facilitate discussion.

[b] These coefficients were inflated by the occurrence of expected frequencies less than unity.

[c] Values in this column are corrected for the ceiling value of the square table involved and, by an approximate method, for the presence of expected frequencies less than unity.

however, the standard errors of the coefficients are of the order of .064 or less for the parent verification study and .088 or less for the teacher verification, so that the .95 confidence ranges are about ± .13 and ± .17, respectively.

Student-Parent Questions

All values for r (or Ø when it applied) except for item numbers 7, 9, 10 and 11 can be regarded as satisfactory. Items 9 and 10 ("School discussions with parents" and "How good a student do parents want you to be") have no "verity" at all, in any of the three senses; there is not even any important disagreement, and cell values in the contingency tables are pretty well random. What the implication of this is is hard to say; certainly we must assume that from a factual standpoint if parent statements here are to be accepted, student claims must be rejected as worthless. Conversely, if the items are still to be regarded as useful, we must ignore these parent reports and attribute "latent" indications to those from the students.

For two items (7, "Library visits" and 11, "How many magazines") the values for C are higher, and those for K lower, than r, suggesting that there are probably systematic biases involved. With item 7, "Library visits" the picture is the same as with item 9. In this case we are interested in its contribution to a scale tapping reading interest of the child. Also worthy of question is the ability of parents to estimate the number of out-of-school library visits--especially of older children. In contrast, item 11 was included in a scale called Reading Material Availability which was an attempt to reflect the actual home environment relative to reading material. The results cast doubt on this scale.

The four best items are:

2. "Child resides with"
3. "Father's education"
4. "Mother's education"
5. "Attended kindergarten"

Items 3 and 4 of Table III-F-2 are all included in our SES scale and have high K values which means that not only can we expect high reliability for this very important scale, but we can interpret student reports fairly literally. A scale involving these items, together with item 6, "Father's employment," will have a reliability coefficient of about .94 and alonger scale still higher.

Teacher-Parent Questions

In Table III-F-3 we have the three items from Questionnaires A and B for which we can test the agreement of teacher and parent. For all three, the values are satisfactorily high. Only in one case, the last, is the difference between coefficients of agreement and correlation high enough to suspect the existence of systematic bias. Examination of the table itself appears to support this conclusion, with teachers tending to give lower occupational levels than claimed by the parent. There are ten misclassifications below the diagonal (eight of one category only), when parent claimed lower, but thirty above the diagonal of which sixteen were for two or more categories lower in teacher's estimation.

There were an additional three items ("Student's race," "Child lives with" and "Attended kindergarten") which were dealt with by teachers in Questionnaire A only, with too few cases (26) to justify statistical treatment. However, the number of perfect agreements were respectively 23, 24 and 23.

Thus, overall, there is good reason to accept information given by teachers.

Teacher-Teacher Questions

An examination of Table III-F-4 shows that once again all correlations are satisfactory, even the lowest of .57 for item 15 ("Child's confidence with adults"). As an indication, a 20-item test with items of the same reliability as this one could be expected to have a reliability coefficient in excess of .90--good, as 20-item tests go.

Several items in this section, notably items 14, 16, 17 and 18 have substantially higher r values than K, probably indicating that

Table III-F-3

Verification Coefficients
Teacher/Parent

Item No.[(a)]	Item Description	Item used in questionnaire forms	C	C corrected	K	r or ϕ	N
3	Father's education	A,B	.69	.75	.66	.75	102
4	Mother's education	A,B	.71	.62	.75	.79	107
6	Father's employment	A,B	.80	.85	.55	.72	115

(a) Item number for identification in this table only, not questionnaire item number

Table III-F-4

Verification Coefficients
Teacher/Teacher

Item No.(a)	Item Description	Item used in questionnaire forms	C	C corrected	K	r or ϕ	N
12	Makes friends	A,B	.61	.75	.62	.68	131
13	Liked by classmates	A,B	.62	.72	.52	.61	132
14	Behavioral age	A,B	.64	.78	.54	.67	132
15	Confidence with adults	A,B	.61	.70	.46	.57	131
16	Child's desire to learn	A,B	.62	.76	.51	.68	130
17	How good a student	A,B	.75	.87	.57	.81	132
18	Child's attention span	A,B	.66	.81	.59	.72	132

(a) Item number for identification in this table only, not questionnaire item number that the time interval between the two applications resulted in systematic biases. Inspection of Table III-F-4 did confirm a vague trend but nothing important and probably not significant.

Conclusion

Although only in the last case (teacher repetition of questionnaire) can we speak of reliability in the usual sense, there is evidence of satisfactory dependability of information collected by means of the questionnaires, whenever the content of the question is factual. For a few questions which are interpretive or a matter of assessment (e.g., "How often does student visit the library?") there is little agreement between parent and student. The effect, either way, on the main study is complex; even high internal consistency of judgment (as for the teachers) can theoretically be invalid; and even outright disagreement between student and parent could still leave us with useful information from the student. In fact, it appears that some possible future analyses might well explore the nature and extent of these differences in perception between parent and child and the relationships of these differences to student outcomes. As part of Project LONGSTEP an exploratory study in this area was conducted. A future volume will cover results of this study.

ATTACHMENTS

1, 2. Parent Verification Questionnaires

3. Teacher Verification Questionnaire

4, 5, 6. Reminder Letters

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Attachment 1

AMERICAN INSTITUTES FOR RESEARCH

Center for Research and Evaluation
in the Applications of Technology in Education

LONGITUDINAL STUDY OF DEMONSTRATION EDUCATION PROGRAMS

PARENT QUESTIONNAIRE

Student Number							
						8	5
1	2	3	4	5	6	7	8

STUDENT'S NAME ______________________________

Your child's school, along with 60 other American schools, is now taking part in a study of new and different school programs. The results of this study, which is sponsored by the U. S. Office of Education, will be used to improve the education of children across the nation. We are asking parents to help by answering a few questions on the child whose name is listed above. Your answers will be used for research purposes only, and no one in the schools will see them.

Please return your completed form as soon as possible. An addressed and stamped envelope is enclosed. When we receive it, we will be happy to send you a new Eisenhower dollar in a plastic display case in appreciation of your cooperation.

INSTRUCTIONS

Mark an "X" in the parentheses to the left of the answer you choose for each question. Choose only one answer for each question.

SAMPLE QUESTION:

How many brothers and sisters does this child have?

1 1 ( )...None

2 ( )...One

3 (X)...Two

4 ( )...Three

5 ( )...Four or more

The child has two brothers and sisters, so the parent who answered the sample question marked an "X" in the parentheses to the left of "Two."

A•I•R ◇ CREATE ☐ P.O. BOX 1113, PALO ALTO, CALIFORNIA 94302 (LOCATION: 1791 ARASTRADERO ROAD) ☐ TEL. (415) 493-3550
CABLE ADDRESS: AIRESEARCH/PALO ALTO

PARENT QUESTIONNAIRE - FORM A

Grades 1 and 2

I. What is this child's date of birth?

_____________/_____________/_____________
Month / Day / Year

9 II. Is this child

1 ( )...Oriental
2 ( )...American Indian
3 ( )...Black
4 ( )...Of Cuban, Mexican or Puerto Rican descent
5 ( )...White (other than of Cuban, Mexican or Puerto Rican descent)
6 ( )...Other

10 III. With whom does this child live?

1 ( )...Both parents (real or adopted)
2 ( )...Mother but not father
3 ( )...Father but not mother
4 ( )...Other relatives
5 ( )...Non-relatives

11 IV. What is the level of education of this child's father (or male head of household)?

1 ( )...Grade school
2 ( )...High school
3 ( )...College
4 ( )...Doesn't currently have a male head of household

12 V. What is the level of education of the child's mother (or female head of household)?

1 ( )...Grade school
2 ( )...High school
3 ( )...College

13 VI. Did the child attend kindergarten?

1 ( )...Yes
2 ( )...No

14 VII. What kind of work does the child's father (or head of household) do? You may not find the exact job listed, but check the one that comes closest. Mark only his main job if he works on more than one job.

1 ( )...Workman or laborer - such as factory worker, cook, gardener, maid, bus driver, gas station attendant, farm worker, waiter, waitress
2 ( )...Skilled craftsman or foreman - such as carpenter, mechanic, plumber, electrician, factory foreman, policeman, draftsman, technician, beautician, seamstress, enlisted man in armed services
3 ( )...Office worker or sales clerk - such as bank clerk, store clerk, bookkeeper, mail clerk, office worker, secretary
4 ( )...Professional - such as teacher, doctor, engineer, lawyer, scientist, dentist, social worker, public accountant
5 ( )...Manager or business owner - such as store or office manager, banker, business owner, farm operator or owner, government official, military officer, real estate or insurance salesman
6 ( )...The father (or head of household) doesn't work

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Attachment 2

AMERICAN INSTITUTES FOR RESEARCH

Center for Research and Evaluation
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LONGITUDINAL STUDY OF DEMONSTRATION EDUCATION PROGRAMS

PARENT QUESTIONNAIRE

STUDENT'S NAME____

Student Number							
						8	6
1	2	3	4	5	6	7	8

Your child's school, along with 60 other American schools, is now taking part in a study of new and different school programs. The results of this study, which is sponsored by the U. S. Office of Education, will be used to improve the education of children across the nation. We are asking parents to help by answering some questions on the child whose name is listed above. Your answers will be used for research purposes only, and no one in the schools will see them.

Please return your completed form as soon as possible. An addressed and stamped envelope is enclosed. When we receive it, we will be happy to send you a new Eisenhower dollar in a plastic display case in appreciation of your cooperation.

INSTRUCTIONS

Mark an "X" in the parentheses to the left of the answer you choose for each question. Choose only one answer for each question.

SAMPLE QUESTION:

How many brothers and sisters does this child have?

1 1 ( )...None

2 ( )...One

3 (X)...Two

4 ( )...Three

5 ( )...Four or more

The child has two brothers and sisters, so the parent who answered the sample question marked an "X" in the parentheses to the left of "Two."

PARENT QUESTIONNAIRE - FORM B-E

Grades 3 through 12

I. What is this child's date of birth?

__________/__________/__________

Month Day Year

9 II. Is this child

1 ( )...Oriental
2 ( )...American Indian
3 ( )...Black
4 ( )...Of Cuban, Mexican, or Puerto Rican descent
5 ( )...White (other than of Cuban, Mexican or Puerto Rican descent)
6 ( )...Other

10 III. With whom does this child live?

1 ( )...Both parents
2 ( )...Mother but not father
3 ( )...Father but not mother
4 ( )...Other relatives
5 ( )...Non-relatives
6 ( )...No one

11 IV. How far did this child's father go in school?

1 ( )...Grade school
2 ( )...Some high school
3 ( )...Graduated from high school
4 ( )...Some college (1-3 years)
5 ( )...Graduated from a four-year college

12 V. How far did this child's mother go in school?

1 ( )...Grade school
2 ( )...Some high school
3 ( )...Graduated from high school
4 ( )...Some college (1-3 years)
5 ( )...Graduated from a four-year college

13 VI. Did this child attend kindergarten?

1 ( )...Yes
2 ( )...No

14 VII. What kind of work does this child's father (or head of household) do? You may not find the exact job listed, but check the one that comes closest. Mark only his main job if he works on more than one job.

1 ( )...Workman or laborer - such as factory worker, cook, gardener, maid, bus driver, gas station attendant, farm worker, waiter, waitress
2 ( )...Skilled craftsman or foreman - such as carpenter, mechanic, plumber, electrician, factory foreman, policeman, draftsman, technician, beautician, seamstress, enlisted man in armed services
3 ( )...Office worker or sales clerk - such as bank clerk, store clerk, bookkeeper, mail clerk, office worker, secretary
4 ( )...Professional - such as teacher, doctor, engineer, lawyer, scientist, dentist, social worker, public accountant
5 ( )...Manager or business owner - such as store or office manager, banker, business owner, farm operator or owner, government official, military officer, real estate or insurance salesman
6 ( )...The father (or head of household) doesn't work

15 VIII. How often does this child go to a public library or bookmobile (not the school library)?

1 ( )...Once a week or more
2 ( )...2 or 3 times a month
3 ( )...About once a month
4 ( )...A few times a year
5 ( )...Never

16 IX. How far in school do you want this child to go?

1 ( )...Don't care
2 ( )...Finish high school
3 ( )...Attend junior college, business or technical school for 1 or 2 years
4 ( )...Graduate from a four-year college
5 ( )...Professional or graduate school after college

17 X. How often do you and this child talk about his or her school work?

1 ( )...Just about every day
2 ( )...Once or twice a week
3 ( )...Less than once a week

18 XI. How good a student do you want this child to be?

1 ( )...One of the best
2 ( )...Above average
3 ( )...About average
4 ( )...Don't care

19 XII. How many magazines with different titles does your family get regularly at home?

1 ( )...None
2 ( )...1 or 2
3 ( )...3 or 4
4 ( )...5 or 6
5 ( )...7 or more

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Attachment 3

AMERICAN INSTITUTES FOR RESEARCH

Center for Research and Evaluation
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LONGITUDINAL STUDY OF DEMONSTRATION EDUCATION PROGRAMS

TEACHER QUESTIONNAIRE - DATA VERIFICATION

You will recall that your school district is participating in a Longitudinal Study of Educational Programs involving more than 20,000 students in 13 school districts throughout the U.S. The study is sponsored by the U.S. Office of Education, and is intended to identify and document educational efforts and their effects on student achievement and motivation. These findings will be used in the design of new educational programs across the nation. As part of this study, we need to verify certain information previously obtained from teachers in the participating districts. The information you fill in should be for the child whose name is listed on each of the included questionnaires. If at all possible, the teacher filling out this form should be the one who previously provided similar information to the A.I.R. Longitudinal Study.

The answers you supply to this questionnaire will be used for research purposes only and will be treated as confidential. Responses to the questionnaire will not be identified by name in any reports to USOE or to the schools.

Your prompt completion of this questionnaire will make an important contribution to the Longitudinal Study. Please put the completed questionnaire into the envelope provided and return it to the school office. We wish to express our appreciation for your contribution to the success of this research.

INSTRUCTIONS

Mark an "X" in the parentheses to the left of the answer you choose for each question. Choose only one answer for each question.

SAMPLE QUESTION:

What school subject is this child's favorite?

1 1 ( )...Music
2 ( )...English
3 (X)...History
4 ( )...Art
5 ( )...Some other subject

The teacher who answered the sample question felt this child preferred History, so he marked an "X" in the parentheses to the left of "History."

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CABLE ADDRESS: AIRESEARCH/PALO ALTO

TEACHER QUESTIONNAIRE - DATA VERIFICATION

Grades 1 through 5

Student Number							
						9	6
1	2	3	4	5	6	7	8

STUDENT'S NAME ______________________________

9 I. Do you recall answering the following questions for this child previously?

1 ( )...Yes
2 ( )...No
3 ( )...Unsure

10 II. In my opinion, this child makes friends easily.

1 ( )...Yes
2 ( )...No
3 ( )...I am unable to say

Does this response indicate a noteworthy change in the last month?

( ) Yes
( ) No

11 III. In relationships with other members of the class this child is

1 ( )...Aggressive
2 ( )...Of average forcefulness
3 ( )...Passive
4 ( )...I am unable to say

Does this response indicate a noteworthy change in the last month?

( ) Yes
( ) No

12 IV. This child acts

1 ( )...Older than his age
2 ( )...About his age
3 ( )...Younger than his age
4 ( )...I am unable to say

Does this response indicate a noteworthy change in the last month?

( ) Yes
( ) No

13 V. In relationships with adults, this child is

1 ( )...Very confident and self-assured
2 ( )...Moderately self-assured
3 ( )...Insecure
4 ( )...I am unable to say

Does this response indicate a noteworthy change in the last month?

( ) Yes
( ) No

14 VI. This child's desire to learn is

1 ( )...Above average
2 ( )...About average
3 ( )...Below average

Does this response indicate a noteworthy change in the last month?

( ) Yes
( ) No

15 VII. How good a student is this child?

1 ( )...One of the best
2 ( )...Above average
3 ( )...About average
4 ( )...Below average

Does this response indicate a noteworthy change in the last month?

( ) Yes
( ) No

16 VIII. This child's attention span is

1 ( )...Longer than most others in his class
2 ( )...About average
3 ( )...Shorter than most others

Does this response indicate a noteworthy change in the last month?

( ) Yes
( ) No

Attachment 4

AIR **AMERICAN INSTITUTES FOR RESEARCH**

BEHAVIORAL SCIENCE AND TECHNOLOGY PROGRAM
P.O. BOX 1113, PALO ALTO, CALIFORNIA 94302

LONGITUDINAL STUDY OF DEMONSTRATION EDUCATION PROGRAMS - PARENT QUESTIONNAIRE

Student's Name ______________________________

Dear Parent:

A couple of weeks ago you should have received a form which asked you to answer some questions about the child whose name is written above. We have not yet received your form and are sending another in case the first one has been lost. We would be grateful to you if you would answer the questions for this child using the stamped, addressed envelope enclosed.

Your child's school is now taking part in a study of new and different school programs. The results of this study, which is sponsored by the U.S. Office of Education, will be used to improve the education of children across the nation. We are asking parents to help by answering our questions. Your answers will be used for research purposes only and will be kept confidential.

Please send your completed form as soon as possible and we will then be happy to send you a new Eisenhower dollar in appreciation of your help.

Sincerely,

Albert B. Chalupsky

Albert B. Chalupsky
Program Director

ABC:cm

Enc.

Location: 1791 Arastradero Road • Cable: AIRESEARCH/PALO ALTO • Tel: (415) 493-3550

Attachment 5

AIR AMERICAN INSTITUTES FOR RESEARCH

BEHAVIORAL SCIENCE AND TECHNOLOGY PROGRAM
P.O. BOX 1113, PALO ALTO, CALIFORNIA 94302

LONGITUDINAL STUDY OF DEMONSTRATION EDUCATION PROGRAMS - PARENT QUESTIONNAIRE

Student's Name ________________________________

Dear Parent:

As you may remember, if our earlier letters have been reaching you, your child's school is taking part in a study of new and different school programs. This study, which is supported by the U. S. Office of Education, will be used to improve education across the nation.

Your reply to our questionnaire is important. It will of course be confidential, and will be used for research purposes only. When we receive your completed form, we will send you a new Eisenhower dollar in appreciation of your help.

Please do answer the questions about your child, and return them to us in the stamped, addressed envelope enclosed.

Sincerely,

Albert B. Chalupsky

Albert B. Chalupsky
Director

Location: 1791 Arastradero Road • Cable: AIRESEARCH/PALO ALTO • Tel: (415) 493-3550

Attachment 6

AIR AMERICAN INSTITUTES FOR RESEARCH

BEHAVIORAL SCIENCE AND TECHNOLOGY PROGRAM
P.O. BOX 1113, PALO ALTO, CALIFORNIA 94302

LONGITUDINAL STUDY OF DEMONSTRATION EDUCATION PROGRAMS - PARENT QUESTIONNAIRE

Student's Name ______________________________

Dear Parent:

If you have received earlier letters from us, please forgive us for making yet another appeal for your help. With the cooperation of your child's school and support of the U.S. Office of Education, our study hopes to improve education across the nation. Your answers to a very few questions are important to us.

Your replies will of course be confidential and used for our research only. As a "Thank You" for your assistance, we will send you a new Eisenhower dollar in a display container. Please answer--your help will be deeply appreciated.

Sincerely,

Albert B. Chalupsky

Albert B. Chalupsky
Director

Enc.

Location: 1791 Arastradero Road • Cable: AIRESEARCH/PALO ALTO • Tel: (415) 493-3550

APPENDIX III-G

Items and Item Alternative Weights Used in the Computation of EdExAG Scales

Items and Item Alternative Weights Used in the Computation of EdExAG Scales

III-G-1

Scale	Abbrev.	Scale Items	Alternatives
Utilization of Objectives	E-UO	Are There Written Objectives?	Item 1 3 - Yes 1 - No
		Objectives in Behavioral Terms	Item 5 3 - Yes 1 - No
		Evaluation Used to Confirm Objectives	Item 71T 3 - Yes 1 - No
External Influence on Treatment Characteristics	E-EITC	Institution Influenced Choice of Treatment	Item 6 3 - Yes 1 - No
		Consultant's Role	Item 8 3 - Full-time 2 - Part-time 1 - No consultant
		Special Funding	Item 21 3 - Yes 1 - No
Staff and Materials Evaluation	E-SME	Teacher Evaluation Procedures	Item 31 3 - Yes, by supervisory ratings 3 - Yes, by peer ratings 3 - Yes, by class performance on achievement tests 3 - Yes, by some other method 1 - No

(Continued)

Items and Item Alternative Weights Used in the Computation of EdExAG Scales (Continued)

Scale	Abbrev.	Scale Items	Alternatives
Staff and Materials Evaluation (cont.)	E-SME	Materials Evaluation Procedures	Item 32 3 - Individual teacher judgment 3 - Teacher committee judgment 3 - Other systematic procedure 1 - No particular evaluation procedure
		Administrative Evaluation Procedures	Item 73T 3 - Yes 1 - No
Treatment Evaluation	E-TE	Informal Classroom Tests	Item 66T 3 - Yes 1 - No
		Standardized Achievement Tests	Item 65S 3 - Yes 1 - No
		Are Evaluative Procedures Systematic?	Item 75T 3 - Yes 1 - No
		Evaluation by Administration	Item 76T 3 - Yes 1 - No
		Evaluation by Teachers	Item 77T 3 - Yes 1 - No
		Evaluation by Researchers	Item 78T 3 - Yes 1 - No

(Continued)

Items and Item Alternative Weights Used in the Computation of EdExAG Scales (Continued)

Scale	Abbrev.	Scale Items	Alternatives
Resistance to Treatment	E-RT	Resistance from Students	Item 23 3 - A great deal 3 - Some 1 - Little or none
		Resistance from Teachers	Item 24 3 - A great deal 3 - Some 1 - Little or none
		Resistance from Administration	Item 25 3 - A great deal 3 - Some 1 - Little or none
		Resistance from Community	Item 26 3 - A great deal 3 - Some 1 - Little or none
School Support Staff	E-SSS	Counselors	Item 47 3 - At the school full-time 2 - At the school part-time 2 - At another location, by appointment 1 - None available
		Learning Disability Therapists	Item 48 3 - At the school full-time 2 - At the school part-time 2 - At another location, by appointment 1 - None available

(Continued)

Items and Item Alternative Weights Used in the Computation of EdExAG Scales (Continued)

Scale	Abbrev.	Scale Items	Alternatives
School Support Staff (cont.)	E-SSS	Home/School Liaison Staff	Item 49 3 - Yes 1 - No
		Librarian	Item 55 3 - Full-time librarian 2 - Part-time librarian 1 - Library, but no librarian 1 - No library
Individualization in Decision Making	E-IDM	Topic Selection	Item 35 3 - Student only 2 - Student and teacher 1 - Teacher only 1 - Treatment dictates topic selection
		Materials/Text Selection	Item 36 3 - Student only 2 - Student and teacher 1 - Teacher only 1 - Treatment dictates materials/text selection
		Sequencing Decisions	Item 37 3 - Student only 2 - Student and teacher 1 - Teacher only 1 - Treatment dictates sequencing

(Continued)

Items and Item Alternative Weights Used in the Computation of EdExAG Scales (Continued)

Scale	Abbrev.	Scale Items	Alternatives
Teacher or Locally Developed Materials	E-TLDM	Externally Developed Materials	Item 7 3 - Little or none 2 - Some 1 - Almost exclusively
		Dependence on Locally Developed Materials	Item 60 3 - Complete dependence 2 - Some dependence 1 - No dependence
Individualization of Instructional Pace	E-IIP	Instructional Pace	Item 38 3 - Individual determines own rate 2 - Individual and group pacing 1 - Group pacing
Use of Students in Treatment	E-UST	Student Helpers	Item 43 3 - Yes 1 - No
		Classroom Use of Student Helpers	Item 44 3 - Instructional 2 - Tutorial 2 - Other 1 - Clerical 1 - Not Used
Utilization of Treatment Evaluation	E-UTE	Evaluation Used to Modify Treatment	Item 72T 3 - Yes 1 - No

(Continued)

Items and Item Alternative Weights Used in the Computation of EdExAG Scales (Continued)

Scale	Abbrev.	Scale Items	Alternatives
Use of Community Resources	E-UCR	Human Skill Resources	Item 52 3 - Use is an integral part of the treatment 2 - Some use made of them 1 - No use made of them
		Natural Resources	Item 53 3 - Use is an integral part of the treatment 2 - Some use made of them 1 - No use made of them
		Neighboring Institutions	Item 54 3 - Use is an integral part of the treatment 2 - Some use made of them 1 - No use made of them
Scheduling Characteristics	E-SC	Scheduling	Item 33 3 - Flexible scheduling 2 - Traditional class period with some variation 1 - Traditional class periods
Use of External Incentives	E-UEI	External Incentives	Item 40 3 - External incentives are an important part of the treatment 2 - Some incentives used 1 - No external incentives are used

(Continued)

Items and Item Alternative Weights Used in the Computation of EdExAG Scales (Continued)

Scale	Abbrev.	Scale Items	Alternatives
Use of Performance Agreements	E-UPA	Performance Agreements	Item 39 3 - Is a major ingredient of the treatment 2 - Used for some areas in the treatment 1 - Not used at all
Classroom Group Organization	E-CGO	Classroom Organization	Item 34 3 - Flexible groupings 2 - Fixed group with some flexible groupings at some times 1 - Traditional fixed group organization
School-Classroom Design	E-SCD	Unique Architectural Features	Item 28 3 - New buildings were designed 3 - Extensive modifications were required in existing buildings 2 - Simple modifications were required in existing buildings 1 - Not at all
		Classroom Structures	Item 63 3 - No partitions--open space 2 - Multiple classrooms separated by movable partitions 1 - Ordinary classroom (4 distinct walls with a door)

(Continued)

Items and Item Alternative Weights Used in the Computation of EdExAG Scales (Continued)

Scale	Abbrev.	Scale Items	Alternatives
Teaching Unit Composition	E-TUC	Teaching Team Size	Item 41 3 - Team teaching in a classroom 2 - One teacher with paid aides per classroom 2 - One teacher with volunteer aides per classroom 1 - One teacher per classroom
		Classroom Use of Adult Aides	Item 42 3 - Instructional 2 - Tutorial 2 - Other 1 - Clerical or supervision 1 - Not used
Status of Treatment Implementation	E-STI	Status of Treatment	Item 18 3 - Pilot study or experimental 1 - Regular part of curriculum
		Longevity of Treatment	Item 19 3 - Less than 1 school year 2 - 1-2 school years 1 - 3 or more school years

(Continued)

Items and Item Alternative Weights Used in the Computation of EdExAG Scales (Continued)

Scale	Abbrev.	Scale Items	Alternatives
Completeness of Instructional Package	E-CIP	Special Instructional Materials	Item 50
			3 - Package provided entire subject matter instruction
			2 - Regular materials supplement special materials
			2 - Package is a supplement to regular subject matter instruction
			1 - No special instructional package provided
		Use of Textbooks	Item 61
			3 - Textbooks are not used
			3 - Other materials used but supplemented by textbooks
			2 - Textbooks are used but supplemented by additional material
			1 - Textbooks are used as the complete source with no additional materials
Teacher In-Service Training	E-TIST	Amount of Inservice Training	Item 30
			3 - More than 2 weeks
			3 - between 1 and 2 weeks
			2 - Three days to a week
			2 - One or two days
			1 - None
Accessibility of Library	E-AL	Accessibility of Library	Item 56
			3 - Free access any period during day
			2 - Scheduled use during school hours
			2 - Use after school only
			1 - No library

(Continued)

Items and Item Alternative Weights Used
in the Computation of EdExAG Scales (Continued)

Scale	Abbrev-	Scale Items	Alternatives
Use of Media Center	E-UMC	Use of Media Center	Item 57 3 - Extensive use made of them 2 - Some use made of them 1 - No use made of them
Utilization of Student Evaluation	E-USE	Classroom Use of Tests	Item 67S 3 - Achievement sequencing, pacing and revision of materials 2 - Achievement sequencing and pacing 1 - Achievement measurement only with no effect on treatment
		Tests Used for Evaluating Student Needs	Item 70S 3 - Yes 1 - No
		Evaluation Used to Modify Student's Treatment	Item 72S 3 - Yes 1 - No
Affective Evaluation	E-AE	Affective Data Collected for Evaluation of the Treatment	Item 74T 3 - Yes 1 - No
		Affective Data Collected for Evaluation of the Student	Item 74S 3 - Yes 1 - No

III-G-10

(Continued)

Items and Item Alternative Weights Used in the Computation of EdExAG Scales (Continued)

Scale	Abbrev.	Scale Items	Alternatives
Mechanism for Reinforcement	E-MFR	Mechanism for Reinforcement	Teacher verbal praise* Granting a student a privelege Tangible reward Other (Specify)
Opportunity for Practice	E-OFP	Opportunity for Practice	Almost always* Sometimes Typically not the case

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*These alternatives were not assigned integer weights.

APPENDIX III-H

Items and Item Alternative Weights Used in the Computation of Classroom Documentation Scales

Items and Item Alternative Weights Used in the Computation of Classroom Documentation Scales

Scale (Abbrev.)	Scale Items	Alternatives
Degree of Grouping (C-DG)	Degree of Grouping	3-Individually 3-Individually and in small groups 2-In small groups 2-Individually and in large groups 2-Individually, in small groups and large groups 1-In large groups 1-Small groups and large groups
Focus of Activities-Cognitive (C-FAC)	Cognitive Activity	3-Most students 2-About half 1-Few students 1-None
Focus of Activities-Affective (C-FAA)	Affective Activity	3-Most students 2-About half 1-Few students 1-None
Use of Materials (C-UM)	Printed Materials	3-Present, in use 2-Present, not in use 1-Not present
	Visual Materials	3-Present, in use 2-Present, not in use 1-Not present
	Audio Materials	3-Present, in use 2-Present, not in use 1-Not present

(continued)

Scale (Abbrev.)	Scale Items	Alternatives
	Manipulative Materials	3-Present, in use 2-Present, not in use 1-Not present
	Instructional Guides	3-Present, in use 2-Present, not in use 1-Not present
Classroom Environment (C-CE)	Lighting Conditions	3-Excellent 2-Average 1-Unsatisfactory
	Heating/Ventilating Conditions	3-Excellent 2-Average 1-Unsatisfactory
	Sound Conditions	3-Excellent 2-Average 1-Unsatisfactory
Study Arrangements (C-SA)	Space Per Student	3-Excellent 2-Average 1-Unsatisfactory
	Flexibility of Seating	3-Excellent 2-Average 1-Unsatisfactory
	Privacy	3-Excellent 2-Average 1-Unsatisfactory

(continued)

Scale (Abbrev.)	Scale Items	Alternatives
Access to Resources (C-AR)	Audio Materials	3-In classroom, easily available
		2-In school, easily available to student
		1-In school, available only with scheduling
		0-None available
	Visual Materials	3-In classroom, easily available
		2-In school, easily available to student
		1-In school, available only with scheduling
		0-None available
	Supplementary Printed Materials	3-In classroom, easily available
		2-In school, easily available to student
		1-In school, available only with scheduling
		0-None available

APPENDIX III-I

Guidelines for the Use of the Classroom Documentation Form

Guidelines for Use of the Classroom Documentation Form

Overview:

The purpose of classroom documentation is to add to our understanding of educational experiences (treatments) which we have identified at each school. By looking in one classroom chosen from the set of classrooms receiving a particular treatment, we are able to obtain new information not previously collected by interview methods. We are also able to verify certain information previously obtained by interview methods. It is important to document both language arts and mathematics since criterion measures of achievement growth are being obtained by CTBS in these two areas.

A very short documentation form has been prepared comprising some 21 new items and four verification items. All site visitors should study the following explanation of those items and the examples given before attending the training sessions on the use of the form. Videotapes of classrooms from two sites will be used to practice in the use of the form. Our objective in studying the explanations and practicing with the form is to increase inter-rater reliability for all obtained information. Toward that end we ask that site documenters apply the explanations and guidelines as given with a minimum of personal interpretation or redefinition.

CLASSROOM ENVIRONMENT

The intent is to describe the physical environment in which learning is taking place and to note whether the circumstances are favorable or unfavorable.

- Lighting conditions are defined as adequacy of illumination and sufficient contrast to make most educational materials clearly visible throughout the room. Inadequate means globe lights, glare or major contrasts throughout the room. Adequate means conditions support rather than hinder learning. Excellent means illumination is "ideal," that is, evenly distributed throughout the classroom and there is a light level on work surfaces so as to be suitable for reading fine print.
- Heating/ventilating conditions are defined as temperature and humidity balance throughout the room. Inadequate means the room is too hot or too cold, or is stuffy as a result of unsatisfactory heating or ventilating controls. Adequate means conditions support rather than hinder learning. Excellent means the room is mechanically climate-controlled, that is, an "ideal" climate is maintained regardless of weather conditions.
- Sound conditions are defined as the acoustical qualities which enable the hearing of instructional content while at the same time suppressing ambient noise. Inadequate means bare floor, ceiling and walls. Adequate means conditions support rather than hinder learning. Excellent means that acoustical treatment is evident in carpeting and wall or ceiling treatment so that reverberation is nil and transmitted sound from external sources is suppressed.

Example #1. A room is old, wood floor, bare walls, globe lights, black chalkboard, sunny side of the building, with radiator heating. Score 1 on lighting, 1 on heating and 1 on sound.

Example #2. A portable room has acoustic tiled walls and is carpeted wall-to-wall, has a number of "soft" florescent lights, a green chalkboard, and has a free-standing stove heater. Score 3 on lighting, 1 on heating, and 2 on sound.

STUDY ARRANGEMENTS

The intent is to document the facilities for study in terms of space, flexibility and privacy.

- Amount of study space per student is defined as the availability of table or desk surfaces ample for the reasonable spreading out on instructional materials. Adequate means sufficient room to spread out a workbook, notebook and tablet to be worked on simultaneously by each child. Inadequate means insufficient room to spread out such study materials. Excellent means sufficient room to spread out these items plus additional work surface space being available to each child.
- Flexibility of seating arrangements is defined as the relative "fixedness" to the room seating. Inadequate means fixed seats or movable but no room for anything but conventional rows. Adequate means that some rearrangement is possible but that furniture design or space limitations fall short of being ideal. In the case of large tables use reasonable judgment as to the probability of its being moved for instructional purposes. Excellent is the provision of small tables or desks that are designed for easy rearrangement and the availability of plenty of room in which to move them.
- Opportunity for privacy is defined as the availability of carrels or positioning of some desks or small tables so as to allow undistracted study. Inadequate means no such spaces or room for only one or two. Adequate means provision for 3 to 5 persons to study in relative privacy from other classroom activities. Excellent means provision for at least 25% of the class to engage in undisturbed study.

Example #1. A classroom is large with few students and has small tables and chairs in various arrangements. An auxiliary media center, used by the class, contains study carrels. Score 3 on all items.

Example #2. A classroom has desks with affixed seats, in rows, in a fairly crowded room. An auxiliary media center, used by the class, has two large tables with chairs all around them. Score 1 on all items.

ACCESS TO RESOURCES

The intent is to document the availability of resources that the student may want to draw on to supplement his basic learning materials.

- Audio materials are those materials which essentially depend on sound, whether recorded or transmitted. Tapes, records, radio, and Language Master audio cards fall in this category.
- Visual materials are those materials which are essentially pictorial or graphic representations with educational value. Films, filmstrips, or study prints fall in this category.
- Supplementary printed materials are defined as library-type materials.

Example #1. A classroom is "traditional" with little storage of materials in the room. With permission, children go to a library containing only books. No media center exists and the principal keeps equipment in a supply room for issue to teachers. Score 1 on audio materials and visual materials. Score 2 on supplementary printed materials.

Example #2. A classroom is a math classroom (at the junior high level) with a wide variety of printed and manipulative materials in it. Students also freely use a well stocked learning resources center with audio, visual and book materials. Score 3 on audio and visual materials. Score 4 on supplementary printed materials.

- -

NOTE: Space is provided for remarks about the learning setting or the dynamics of the teaching-learning interaction which are not covered by the scored items on the documentation sheet. For instance, the comments may concern things observed which may help in completing the EDEXAG treatment description.

Example: "Objectives of the day's study were read aloud to the children. Two teacher aides were present throughout."

DEGREE OF GROUPING

The intent is to describe whether the class is studying in an individualized, small group or large group mode or some combination of these, relative to the subject matter.

- Individualized is defined as studying singly or in "independent" pairs. If everyone is studying the same assignment it should be classed as large group. Note that"the same assignment"refers to a task (reading a given chapter, etc.) and not to a topic (learning vocabulary, etc.).
- Small group is defined as studying in a group of three to nine.
- Large group is defined as studying in a group of ten or more.

Example #1. A class of 25, composed of one group of 12 children, two groups of four children, and five children studying independently. Mark answer 7.

Example #2. A class of 24, composed of three groups of 8 children. Mark answer 2.

Example #3. A class of 30, all are studying individually but during the 15-minute period all students form into a single group for further instruction. Mark answer 5.

FOCUS OF ACTIVITIES

The intent is to describe whether the class is studying cognitive or affective material or both. If the school schedule calls for either Language Arts or Mathematics to be taught but the class is not actually engaged in that activity, delay documentation until study begins.

- Cognitive material is defined as the acquisition of information or skills in Language Arts or Mathematics.
- Affective material is defined as the development of positive attitudes toward self or others.

Example #1. A class is solving arithmetic computation problems, nothing else is happening. Score 4 on cognitive and 1 on affective.

Example #2. A class is engaged in two activities. About half the class is working on vocabulary development. The other half of the class is studying social studies. No other activity is occurring. Score 3 on cognitive. Score 1 on affective.

Example #3. A class is engaged in two activities. About half of the group is reading a story. The story is designed to modify attitudes about ethnic groups. The other half of the class is studying fractions. Score 3 on cognitive for Language Arts or Mathematics depending on which is being documented on that sheet. Score 3 on affective for Language Arts, but score 1 for affective on Mathematics.

USE OF MATERIALS

The intent is to describe the variety in types of materials present or in use in the classroom. Materials should be readily visible (e.g., on shelves, open-access cabinets) in the classroom or learning center.

- Printed materials are those materials which are essentially verbal and in paper form. Texts, workbooks, programmed instruction materials and SRA Reading kits fall in this category.
- Visual materials - defined as before.
- Audio materials - defined as before.
- Manipulative materials are those objects which are essentially handled or examined directly. Models, specimens, and activity materials such as cuisenaire rods, educational games and flash cards fall in this category.
- Instructional guides are the special class of materials which direct children to appropriate study materials for attainment of objectives. In general, these guides pertain to modules of instruction and are used individually by children. Note that instructional guides need not constantly be in use or be used by all students. The critical question is whether the children are doing what they are doing because an instructional guide prompted that activity. Teaching-learning units, learning activity packages, contracts, continuous progress worksheets, and teacher-made modules fall in this category.

Example #1. A class is engaged in oral reading. Visible in the room are manipulative materials and filmstrips. Score 3 on printed materials, 2 on visual materials, 1 on audio materials, 2 on manipulative materials, and 1 on instructional guides.

Example #2. A class is using teaching-learning units in an individualized mode. Some children are reading, some working with flash cards. In a nearby media center, some are listening to tapes and some are viewing an 8mm film. Score 3 on all categories.

Note: The documenter may have to move to another location to see what various class members are doing.

APPENDIX IV-A

An Investigation of Longitudinal Changes in Innovative School Programs

APPENDIX IV-A

An Investigation of Longitudinal Changes in Innovative School Programs

Rationale

One of the most intriguing, but largely unexplored, areas of educational research is the phenomenon of change in school programs over time. A major unanswered question is the extent to which change, when it does occur, is stable--i.e., has a lasting effect on instructional strategies and approaches from one year to the next. More specifically, what is the long-range effect when a school system adopts an innovative program or practice? Does this lead to more innovation throughout the system? Is "innovativeness" sustained, or is there an eventual regression to the more traditional approaches once the new idea has been tried out?

During the four years in which interview and observation data were collected from the various school districts represented in Project LONGSTEP, site visitors shared a general impression that many of the districts were becoming slightly more traditional in their educational treatments. At several locations there appeared to be less use being made each year of such innovative practices as individualized materials, interdisciplinary and team teaching, and emphasis on the affective domain in the instructional program. There was a growing feeling on the part of staff members that innovation might be a cyclical process; since districts had been selected largely on the basis of reported innovative programs, perhaps selection had occurred at the peak of this cycle or curve, and site visiting was occurring during the downward slope of the curve, with a gradual shift from innovation back to tradition. In short, there appeared to be a "regression to the mean" across school programs.

If this phenomenon did exist, it would have major implications for those who design and implement new programs in the schools. It would be of importance also to know whether or not programs remain relatively stable over time, and whether this stability exists at all grade levels and across program elements.

It was decided that answers to some of these questions might be found by a more rigorous examination of the empirical data collected for Project LONGSTEP over a four-year period. This appendix describes the results of that analysis.

Procedures

The central focus of the analysis was the extent to which educational practices undergo change or remain stable over time. The elements of analysis were therefore selected scales from the Educational Experience Analysis Guides which described treatment group characteristics at each site for the four school years from 1970-71 through 1973-74. The scales of interest were those considered to be the primary measures of innovation obtained in Project LONGSTEP in the subject areas of language arts and math. A list of the scales, the items comprising each scale and the scores for item alternatives are included in Attachment 1 following this appendix. A complete discussion of scale construction and analysis procedures and the coefficient alphas for the multi-item scales are contained in Chapter III of the report.

Scale items were scored in the direction of greater innovativeness. For those scales consisting of dichotomous items from the EdExAG, a "Yes" response earned a score of "3" on each item, while a "No" response earned a score of "1." Scores on all of the items in the scale were then averaged to obtain the scale score. For those scales containing multi-choice items, a score of "1," "2," or "3" was assigned to each choice, reflecting a range from traditional to innovative with "2" as a midpoint. Here, too, item scores were averaged to obtain scale scores.

Not all of the schools and grades which participated in Project LONGSTEP were included in this analysis sample. Because the study was not cross-sectional but rather had been designed to follow students as they progressed from one grade to the next, there were some schools and grades where data had not been collected for more than one or two years. The sample for the stability analysis consisted only of those grades and schools in which data had been collected for three consecutive school years.

Once these grades and schools had been defined, they were visited for an additional year for purposes of program documentation.

Two other characteristics of the data should be noted. The basic unit of analysis was the EdExAG group, defined as all the students in a school who were receiving the same educational treatment in a particular year. In some cases, an EdExAG group consisted only of students in one classroom; in other instances an EdExAG group included all students at one grade level or all students enrolled in language arts or math in one school. Consequently, there was wide variation in the number of students represented by one EdExAG group as compared with another. No weighting procedure was performed to adjust for this variation. EdExAG scores were considered equal, regardless of the number of students included in the educational treatment. There was a similar variation in the number of EdExAG groups at the different grade levels, largely as a result of the student tracking procedure mentioned earlier. Tables 1 and 2 show the number of EdExAG groups by grade and by year that were included in the analysis. (All of the tables used in the analysis are included in Attachment 2 at the end of this appendix.) As can be seen there were relatively few student groups at the ninth and tenth grade levels for all four years of the study. In the discussion that follows, therefore, greater confidence can be placed in the results from the lower grades because of the larger number of treatment groups involved.

Four data sets were used in the analysis, consisting of

(1) the mean scores on each scale for all math EdExAG groups at each grade level for all schools combined;
(2) the mean scores on each scale for all language arts EdExAG groups at each grade level for all schools combined;
(3) the mean scores on each scale for all math EdExAG groups at an individual school, across all grades;
(4) the mean scores on each scale for all language arts EdExAG groups at an individual school, across all grades.

Three separate analyses were performed. The purpose of the first was to determine whether schools in general were becoming more innovative or more traditional in certain aspects of their programs. The purpose of the second was to look for any significant shifts toward more innovative or more traditional practices within grade levels for all schools combined. Finally, the scale scores from a small number of "high change" schools were analyzed to determine if changes at individual schools were in a consistent direction--i.e., toward innovation or toward traditional approaches across time.

Two criteria were used for defining a "significant program change." For the four scales consisting of only one item from the questionnaires, the difference between the mean score in Year 1 and mean score in Year 4 had to be .5 or greater. This would indicate that at least half of the EdExAG groups had changed by one scale score or more. For those scales consisting of multiple questionnaire items, the difference in mean scores had to be .3 or greater, approximating a similar shift in mean scores for half of the groups. Possible scores ranged from 1.0 to 3.0, with the higher score representing a more innovative approach. Although scores for all four years of data collection were available, comparisons were made only between the first year and the last as a means of assessing long-term trends and also to reduce the complexity of the analysis. Exceptions were the scales relating to Completeness of Instructional Package and Utilization of Student Evaluation, where scores were deleted for Year 1 because of incomparability of the component items. For these two scales, comparisons were made between Year 2 and Year 4.

Findings

Trends in Dimensions of Innovation

1. Utilization of Objectives. For schools in this analysis, one of the most widespread and consistently used innovations across grades and time was the use and evaluation of behavioral objectives, in both language arts and math. A scale score of 2.0 or higher indicated more "Yes" than "No" answers to questions about the existence of written objectives for the treatment group, whether these objectives were stated in behavioral terms, and whether evaluative procedures were used to confirm the attainment

of objectives. During the first year of the study, it was only in fifth and tenth grade math that mean scores were at or below 2.0, and in both instances there was an increase in the use of objectives by Year 4. The only significant decrease in the use of objectives across the four years occurred in the ninth grade for language arts (from 2.8 to 1.9). Otherwise, scores were relatively stable and high (2.5 or better) for all grade levels and all schools combined. (See Tables 3 and 4.)

2. Individualization in Decision Making. Overall, the students in this analysis appear to have had relatively little choice in deciding the topics, materials, and sequencing of instruction for either language arts or math. With one exception, mean scores were low for all grades during both Year 1 and Year 4 (less than 1.5), indicating a tendency for such decisions to be made by the teacher only or to be dictated by the materials or curriculum. In only one case (ninth grade language arts during Year 1) was the mean score greater than 1.5, and there was a decrease in this score by Year 4. Otherwise, there was little or no change across grades over time. (See Tables 5 and 6.)

3. Teacher or Locally Developed Materials. At most grade levels, the schools in this analysis tended to depend on externally developed materials for their math and language arts programs. However, scores for the seventh and eighth grades, in each of the four years, indicated a slightly greater use of teacher or locally developed instructional materials at the junior high level. Over time, it is possible to discern a slight and consistent trend toward local materials in math between Years 1 and 4, especially for grades 2, 3, 4, 7 and 9. In language arts, the largest change was toward local materials in grade 9. (See Tables 7 and 8.)

4. Individualization of Instructional Pace. For this one-item scale, a score of 1.0 meant that group pacing was the norm for classroom instruction, while a score of 3.0 meant that students were allowed to determine their own individual rate of progress. Mean scores for both language arts and math for most grades and in every year were at or near 2.0, indicating that among the schools in this sample there was general use of both group

and individual pacing within treatment groups. Scores tended to be slightly lower for grades 9 and 10 in language arts. There were no significant changes in this pattern over time in either language arts or math. (See Tables 9 and 10.)

5. Scheduling Characteristics. For grades 2 through 8, the mean scores on this scale show a tendency toward traditional class periods with some variation for both language arts and math. Scheduling for grades 9 and 10 was more often characterized as traditional class periods only. The only notable change occurred in language arts for grade 8 where the shift was away from flexibility toward a fixed schedule (from 2.0 to 1.5). However, over time for nearly all grade levels in both subjects, it is possible to see a slight trend toward traditional schedules. (See Tables 11 and 12.)

6. Use of Performance Agreements. The use of performance agreements, an assumed characteristic of many individualized instructional programs, did not appear to be a widespread practice in these groups for either language arts or math. Most mean scores fell between 2.0 (used for some areas in the treatment) and 1.0 (not used at all). Moreover, nearly all major changes over time were downward, especially in grades 2, 3 and 10. (See Tables 13 and 14.)

7. Classroom Group Organization. By and large, classroom grouping patterns were more likely to be flexible than fixed, with slightly higher flexibility in grades 2, 3 and 4 for both language arts and math. Scores generally indicated the use of fixed groups with some flexible grouping at some times. Mean scores were relatively stable over time for both language arts and math, with the only large decrease in grade 8 for language arts, and the only large increase in grade 10 for math. (See Tables 15 and 16.)

8. Teaching Unit Composition. This scale measures the extent to which a teacher is instructing alone in the classroom, has paid or volunteer helpers, or is part of a team teaching situation. Generally, the picture over all grades and years is one of a teacher working with the help of aides. There is a slight tendency toward team teaching during

Year 1 only, in grades 2 and 3, and toward the teacher as sole instructor in grade 10 for both Year 1 and Year 4. The pattern is similar for both language arts and math. Major changes over time are all in a downward direction, which may be indicative of a loss of funds as much as a shift toward a more traditional setting. These changes occurred in grades 2, 3, 4, 9 and 10 for math; and in grades 2 and 3 for language arts. (See Tables 17 and 18.)

9. Completeness of Instructional Package. Items in this scale were developed on the theory that innovative school programs are more apt to utilize special instructional packages or materials and are less likely to rely on textbooks than are traditional programs. Generally, the mean scores indicate that both textbooks and special materials were used within all treatment groups for both language arts and math, with little variation across grades or time. The only exception is a slight decrease in the use of special materials in tenth grade language arts. (See Tables 19 and 20.)

10. Utilization of Student Evaluation. A major characteristic of individualized, although not necessarily innovative, programs is the use of evaluative procedures to assess the progress of individual students rather than the class as a whole, as well as to modify the educational treatment based on this evaluation. At nearly every grade level, for both language arts and math, scores on this scale were relatively high and stable. A notable exception is grade 9, where there was an obvious trend toward traditional achievement measurement in language arts, and scores were comparatively low though stable in math. There was a similar shift toward traditional assessment in tenth grade language arts, although student evaluation remained at a high and consistent level in math. (See Tables 21 and 22.)

Trends within Grade Levels

For this analysis, data were examined only for grades 3, 5, 7, 9 and 10, providing two grades at the elementary school level, two at the junior high school level, and one grade at the high school level. It was felt that these data would be sufficient to show any inter-grade differences in trends over time, without being redundant (i.e., grades 3 and 4 in any given school were likely to have very similar instructional programs).

Grade 3. Taking 2.0 as a midpoint between a highly traditional (1.0) and highly innovative (3.0) program, mean scores for grade 3 on the ten scales of interest were about evenly divided between traditional and innovative tendencies across time for both language arts and math. Except for an increase in the use of teacher developed materials for math, other changes between Years 1 and 4 were mostly in a downward direction. In math, there was less use of performance agreements and fewer adults in the classroom. In language arts, also, there were fewer adults in the teaching unit. (See Tables 23 and 24.)

Grade 5. Mean scores for grade 5 in both language arts and math generally tended toward the traditional end of the scale except for the use of objectives and the use of student evaluation, both of which received scores leaning toward the innovative. For both subjects, scores were extremely stable across the four years. The only major changes in any direction were an upward trend in the use of objectives and student evaluation for math. (See Tables 25 and 26.)

Grade 7. Overall, mean scores for grade 7 tended to be at a midpoint on the innovative continuum, except for an unusually high use of objectives and relatively low use of individualization in decision making and flexible scheduling. The only changes over time worth noting occurred in math, where there was an increase in the use of teacher or locally developed materials, and the use of performance agreements. (See Tables 27 and 28.)

Grade 9. Mean scores for grade 9 tended to be low on all of the scales, except use of objectives which was high for both language arts and math during most years. However, there was a sharp drop by Year 4 in the use of objectives for language arts. Other decreases occurred in the use of student evaluation and individualization in decision making for language arts, and in the size of the teaching unit for math. The only notable increase was in the use of locally or teacher developed materials for both subjects. Overall, program components at the ninth grade level tended toward the traditional. (See Tables 29 and 30.)

Grade 10. Mean scores remained at a relatively low level over time in both language arts and math. One exception was the use of objectives, which by Year 4 had shown an increase to a relatively high level in both subjects. There was an increase also in the flexibility of classroom grouping for math, although scores for both Year 1 and Year 4 tended toward the traditional (from 1.3 to 1.8). For math, decreases occurred over time in the use of performance agreements and in the size of the teaching unit composition. For language arts, there were decreases in the use of special instructional materials and in the use of student evaluation. (See Tables 31 and 32.)

Trends within "High Change" Schools

The analysis of changes and trends, by innovative scales and by grade levels, was based on scores for all schools combined. It was recognized that such combined scores would tend to obscure the variation occurring in individual schools. Therefore, a third analysis was conducted to determine if there were discernible trends toward more innovative or more traditional approaches in certain "high change" schools.

For this analysis, scores were examined for each of the 44 schools in the study, and tallies were made of any significant changes that had occurred between any of the four years. The criteria for significant change were the same as those used in the earlier analyses--i.e., .5 on one-item scales, and .3 on multi-item scales. Schools were then arranged by rank order, and the top ten were selected in terms of the number of changes occurring over scales and over time. It was felt that no more than two schools per district should be included in the analysis, for a more representative sample. Four of the top ten schools were eliminated on the basis of this criterion, and the final group therefore included schools among the top 14 in terms of change, representing six districts. The analysis was limited to grades 3, 5, 7 and 9, and this in turn meant that each school was represented by only one or two grade levels. Figures 1 and 2 show the direction of the changes that occurred between Year 1 and Year 4 in the ten selected schools. (Comparisons are between Years 2 and 4 for Completeness of Instructional Package and Utilization of Student Evaluation, for reasons explained earlier.)

Name of Scale	School									
	1	2	3	4	5	6	7	8	9	10
Utilization of Objectives	o	+	-	-	o	-	-	o	o	-
Individualization in Decision Making	o	o	-	-	+	-	o	-	-	-
Teacher or Locally Developed Materials	o	-	o	o	o	o	+	+	-	o
Individualization of Instructional Pace	+	o	o	-	-	o	-	o	o	o
Scheduling Characteristics	o	+	o	-	o	+	+	-	-	-
Use of Performance Agreements	+	-	-	-	-	-	-	o	o	-
Classroom Group Organization	+	+	-	-	-	o	-	o	o	o
Teaching Unit Composition	+	-	-	-	o	o	-	-	o	-
Completeness of Instructional Package	+	o	+	o	o	o	o	o	o	-
Utilization of Student Evaluation	+	-	+	-	o	-	-	-	-	-

+ significant increase
- significant decrease
o no change

Figure 1. Trends over time in innovative practices of high change schools - language arts.

Name of Scale					School					
	1	2	3	4	5	6	7	8	9	10
Utilization of Objectives	o	+	-	-	o	-	-	o	o	-
Individualization in Decision Making	o	o	-	-	+	-	o	-	-	-
Teacher or Locally Developed Materials	o	+	-	o	o	o	+	+	o	o
Individualization of Instructional Pace	+	+	-	o	-	o	-	o	o	o
Scheduling Characteristics	o	o	-	-	o	+	+	-	-	-
Use of Performance Agreements	+	-	-	-	-	-	-	o	o	-
Classroom Group Organization	+	+	-	o	-	o	-	o	o	o
Teaching Unit Composition	+	-	-	-	o	o	-	-	-	-
Completeness of Instructional Package	+	o	-	-	o	o	o	o	+	o
Utilization of Student Evaluation	+	-	-	o	o	-	-	-	o	-

+ significant increase
- significant decrease
o no change

Figure 2. Trends over time in innovative practices of high change schools - math.

Only one of the ten schools exhibited a consistent and marked trend toward innovation over the four years of the study. By the end of Year 4, this school had the highest possible scores (3.0) on seven of the ten scales for both language arts and math, with a score of 2.5 on one other scale. Paradoxically, for the two remaining scales (Individualization in Decision Making and Teacher or Locally Developed Materials), scores were relatively stable and low over time.

One of the schools appeared to be in a state of flux, with an almost even number of changes toward innovation and toward the traditional. Generally, however, scores tended to be low during both Year 1 and Year 4 and for both language arts and math in this school.

For all of the other eight schools, the number of changes in the traditional direction far outnumbered changes toward innovation in both language arts and math, indicating a clear trend toward traditional educational approaches and confirming the hypothesis on which the analysis was based. In one of these eight schools, the trend was downward on all ten scales of innovation for math.

The sharpest declines occurred across schools in the use of performance agreements and the size of the teaching unit, in both language arts and math. Seven of the ten schools had decreasing scores on these scales. Six of the ten schools showed a decreasing use of individualization in decision making and the use of student evaluation. At five of the ten schools, there was less use of objectives and less flexibility in class scheduling. The only scales which remained relatively stable over time for all of the schools were Teacher or Locally Developed Materials, Individualization of Instructional Pace, Flexibility of Classroom Grouping, and the Use of Special Instructional Materials.

Conclusions

The findings from all three analyses generally indicated that, even among relatively innovative schools, there were traditional approaches in many aspects of the educational program. This was true for both language arts and math instruction, and for all grade levels. It was also true that within schools, within grades, and within program components there were many fluctuations from year to year in an orientation toward the traditional or the innovative; and only rarely was there a consistent pattern to these changes within an individual school. Over time, however, there was a discernible trend toward more traditional instruction across most of the schools and grades studied; and this trend was even more pronounced in those schools exhibiting the most changes.

These analyses documented with empirical data the existence of a "regression to the mean" phenomenon in a group of innovative school programs. What the data do not reveal is why this phenomenon occurs, and it is interesting to speculate on possible causes, such as:

- reduced federal and state funding over time for special programs, and the inability of local districts to continue support for expensive programs;
- insufficient attention to the process of change, and a general lack of planning for the facilitation of such change;
- unrealistic expectations for the outcomes of innovative programs, and subsequent disenchantment with the effects they produce;
- lack of commitment at the school level to new programs and to the integration of innovations into the total educational program;
- the natural inertia of any organization to change;
- a perceived lack of effectiveness of innovative approaches, as compared with the familiar traditional practices.

It was not the purpose of this investigation to look for reasons for this regression. However, it would appear to have important implications for those who plan or implement new educational approaches. Innovative changes do not sustain themselves over time; if it is the intent of school administrators to move their programs in an innovative direction, then some attention must be paid to this drift back toward the traditional and ways must be found to maintain the innovative thrust of the educational approach.

Attachment 1

Scale Name	Scale Items	Alternative Scores
Utilization of Objectives	Are there written objectives?	3 - Yes 1 - No
	Objectives in behavioral terms	3 - Yes 1 - No
	Evaluation used to confirm objectives	3 - Yes 1 - No
Individualization in Decision Making	Topic selection	3 - Student only 2 - Student and teacher 1 - Teacher only 1 - Treatment dictates topic selection
	Materials/text selection	3 - Student only 2 - Student and teacher 1 - Teacher only 1 - Treatment dictates materials/text selection
	Sequencing decisions	3 - Student only 2 - Student and teacher 1 - Teacher only 1 - Treatment dictates sequencing
Teacher or Locally Developed Materials	Externally developed materials	3 - Little or none 2 - Some 1 - Almost exclusively
	Dependence on locally developed materials	3 - Complete dependence 2 - Some dependence 1 - No dependence
Individualization of Instructional Pace	Instructional pace	3 - Individual determines own rate 2 - Individual and group pacing 1 - Group pacing

Scale Name	Scale Items	Alternative Scores
Scheduling Characteristics	Scheduling	3 - Flexible scheduling 2 - Traditional class period with some variation 1 - Traditional class periods
Use of Performance Agreements	Performance agreements	3 - Is a major ingredient of the treatment 2 - Used for some areas in the treatment 1 - Not used at all
Classroom Group Organization	Classroom organization	3 - Flexible groupings 2 - Fixed group with some flexible groupings at some times 1 - Traditional fixed group organization
Teaching Unit Composition	Teaching team size	3 - Team teaching in a classroom 2 - One teacher with paid aides per classroom 2 - One teacher with volunteer aides per classroom 1 - One teacher per classroom
	Classroom use of adult aides	3 - Instructional 2 - Tutorial 2 - Other 1 - Clerical or supervision 1 - Not used

Scale Name	Scale Items	Alternative Scores
Completeness of Instructional Package[1]	Special instructional materials	3 - Package provided entire subject matter instruction 2 - Regular materials supplement special materials 2 - Package is a supplement to regular subject matter instruction 1 - No special instructional package provided
	Use of textbooks	3 - Textbooks are not used 3 - Other materials used but supplemented by textbooks 2 - Textbooks are used but supplemented by additional material 1 - Textbooks are used as the complete source with no additional materials
Utilization of Student Evaluation[1]	Classroom use of tests	3 - Achievement sequencing, pacing and revision of materials 2 - Achievement sequencing and pacing 1 - Achievement measurement only with no effect on treatment
	Tests used for evaluating student needs	3 - Yes 1 - No
	Evaluation used to modify student's treatment	3 - Yes 1 - No

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[1] Not all items were asked on 1970-71 EdExAG; therefore Year 1 data for these two scales have not been included in this analysis.

Attachment 2

TABLE 1

Number of Language Arts EdExAG Groups Involved in Program Change Analyses

Grade	Year			
	1	2	3	4
2	14	16	14	13
3	14	16	18	14
4	15	19	18	15
5	30	33	33	33
6	15	14	19	21
7	8	11	15	15
8	6	8	11	11
9	4	5	5	5
10	3	6	5	5

TABLE 2

Number of Math EdExAG Groups Involved in Program Change Analyses

Grade	Year			
	1	2	3	4
2	14	16	14	13
3	14	16	17	15
4	14	19	18	16
5	30	33	34	31
6	15	14	20	21
7	9	10	16	14
8	6	8	15	15
9	4	5	5	5
10	3	5	5	4

TABLE 3

Mean Scores by Grade for Utilization of Objectives - Language Arts

Grade	Year 1	Year 2	Year 3	Year 4
2	2.6	2.7	2.6	2.6
3	2.6	2.7	2.3	2.6
4	2.5	2.7	2.3	2.6
5	2.2	2.1	2.3	2.4
6	2.7	2.5	2.7	2.6
7	2.8	2.2	2.6	2.6
8	2.8	2.5	2.8	2.7
9	2.8	2.5	2.5	1.9
10	2.3	2.8	2.9	2.7

TABLE 4

Mean Scores by Grade for Utilization of Objectives - Math

Grade	Year 1	Year 2	Year 3	Year 4
2	2.6	2.7	2.6	2.6
3	2.6	2.7	2.3	2.6
4	2.5	2.9	2.3	2.6
5	2.0	2.1	2.3	2.4
6	2.5	2.5	2.9	2.7
7	2.7	2.5	2.8	2.7
8	2.7	2.6	2.9	2.7
9	2.5	2.3	2.7	2.3
10	1.7	2.6	2.6	2.5

TABLE 5

Mean Scores by Grade for Individualization in Decision Making - Language Arts

Grade	Year 1	2	3	4
2	1.5	1.4	1.5	1.3
3	1.5	1.4	1.5	1.4
4	1.4	1.5	1.5	1.3
5	1.4	1.2	1.4	1.2
6	1.5	1.3	1.5	1.3
7	1.5	1.3	1.4	1.4
8	1.4	1.4	1.4	1.4
9	1.6	1.2	1.3	1.3
10	1.3	1.7	1.4	1.5

TABLE 6

Mean Scores by Grade for Individualization in Decision Making - Math

Grade	Year 1	2	3	4
2	1.5	1.4	1.5	1.3
3	1.5	1.4	1.5	1.3
4	1.5	1.4	1.5	1.3
5	1.4	1.3	1.2	1.2
6	1.5	1.4	1.3	1.3
7	1.3	1.4	1.2	1.3
8	1.3	1.1	1.2	1.2
9	1.4	1.2	1.3	1.3
10	1.2	1.5	1.3	1.3

TABLE 7

Mean Scores by Grade for Teacher or Locally Developed Materials - Language Arts

Grade	Year 1	Year 2	Year 3	Year 4
2	1.5	1.5	1.6	1.5
3	1.5	1.5	1.8	1.6
4	1.6	1.7	1.8	1.6
5	1.7	1.7	1.8	1.7
6	1.8	1.8	1.9	1.9
7	2.1	2.2	2.3	2.3
8	2.2	2.4	2.2	2.2
9	1.9	2.0	2.2	2.2
10	1.7	2.1	2.1	1.9

TABLE 8

Mean Scores by Grade for Teacher or Locally Developed Materials - Math

Grade	Year 1	Year 2	Year 3	Year 4
2	1.4	1.4	1.7	1.7
3	1.4	1.4	1.8	1.9
4	1.5	1.5	1.8	1.9
5	1.8	1.7	1.8	1.8
6	1.9	1.8	1.9	1.9
7	1.9	2.1	2.3	2.3
8	2.1	2.0	2.2	2.2
9	1.8	2.0	2.0	2.1
10	1.7	1.8	1.8	1.8

TABLE 9

Mean Scores by Grade for Individualization of Instructional Pace - Language Arts

Grade	Year 1	2	3	4
2	2.1	2.3	2.3	2.0
3	2.1	2.2	2.2	2.1
4	2.1	2.1	2.2	2.0
5	1.9	1.9	1.9	1.9
6	2.2	2.1	2.2	2.0
7	2.1	2.1	2.1	2.0
8	2.2	2.0	2.2	2.0
9	2.0	1.6	1.8	1.6
10	1.7	1.7	1.6	1.6

TABLE 10

Mean Scores by Grade for Individualization of Instructional Pace - Math

Grade	Year 1	2	3	4
2	2.2	2.3	2.3	2.1
3	2.2	2.2	2.2	2.1
4	2.1	2.2	2.2	2.0
5	1.8	1.8	1.9	1.9
6	2.3	2.2	2.4	2.2
7	2.0	2.3	2.4	2.3
8	2.0	1.9	2.4	2.3
9	1.8	1.8	2.2	2.2
10	1.7	2.2	1.8	1.8

TABLE 11

Mean Scores by Grade for Scheduling Characteristics - Language Arts

Grade	Year			
	1	2	3	4
2	1.9	1.7	1.8	1.7
3	1.9	1.7	1.8	1.9
4	2.0	1.8	1.8	1.7
5	1.7	1.4	1.6	1.5
6	1.9	1.5	1.8	1.6
7	1.9	1.6	1.7	1.5
8	2.0	1.8	1.9	1.5
9	1.5	1.2	1.2	1.2
10	1.3	1.7	1.6	1.4

TABLE 12

Mean Scores by Grade for Scheduling Characteristics - Math

Grade	Year			
	1	2	3	4
2	1.9	1.7	1.8	1.6
3	1.9	1.7	1.8	1.8
4	2.0	1.8	1.7	1.6
5	1.7	1.4	1.5	1.5
6	1.8	1.4	1.8	1.6
7	1.7	1.5	1.6	1.5
8	1.8	1.6	1.7	1.4
9	1.5	1.2	1.2	1.2
10	1.3	1.6	1.6	1.5

TABLE 13

Mean Scores by Grade for Use of Performance Agreements - Language Arts

Grade	Year			
	1	2	3	4
2	1.9	1.6	1.6	1.5
3	1.9	1.6	1.5	1.5
4	1.7	1.6	1.6	1.5
5	1.7	1.5	1.6	1.5
6	1.8	1.6	1.9	1.8
7	1.8	1.5	2.1	2.1
8	1.8	1.5	2.0	2.0
9	1.8	1.6	1.4	1.4
10	2.0	1.5	1.4	1.6

TABLE 14

Mean Scores by Grade for Use of Performance Agreements - Math

Grade	Year			
	1	2	3	4
2	2.0	1.6	1.6	1.5
3	2.0	1.6	1.5	1.5
4	1.8	1.6	1.6	1.5
5	1.7	1.6	1.7	1.6
6	1.9	1.6	2.2	1.9
7	1.9	2.1	2.4	2.4
8	1.8	1.6	2.3	2.1
9	1.8	1.6	1.6	1.6
10	2.0	1.4	1.2	1.5

TABLE 15

Mean Scores by Grade for
Classroom Group Organization - Language Arts

Grade	Year 1	2	3	4
2	2.2	2.3	2.4	2.3
3	2.2	2.3	2.3	2.4
4	2.3	2.2	2.4	2.3
5	1.9	1.8	2.1	2.0
6	2.3	1.9	2.2	2.0
7	2.3	2.0	2.0	1.9
8	2.3	2.0	1.8	1.7
9	2.0	2.0	1.8	1.8
10	1.7	2.2	2.0	1.8

TABLE 16

Mean Scores by Grade for
Classroom Group Organization - Math

Grade	Year 1	2	3	4
2	2.1	2.3	2.4	2.3
3	2.1	2.2	2.4	2.4
4	2.1	2.2	2.4	2.4
5	1.9	1.9	1.9	2.1
6	2.1	2.0	2.0	2.0
7	2.0	2.2	2.1	1.9
8	2.0	1.8	1.9	1.8
9	1.8	1.8	2.2	2.0
10	1.3	2.0	2.0	1.8

TABLE 17

Mean Scores by Grade for Teaching Unit Composition - Language Arts

Grade	Year			
	1	2	3	4
2	2.3	2.0	2.0	2.0
3	2.3	2.0	1.8	1.9
4	2.1	1.9	2.0	1.9
5	1.7	1.8	1.6	1.7
6	1.8	1.8	2.1	1.8
7	1.9	1.8	2.0	1.9
8	1.8	1.6	2.1	1.9
9	1.6	1.6	1.8	1.6
10	1.3	1.8	1.3	1.4

TABLE 18

Mean Scores by Grade for Teaching Unit Composition - Math

Grade	Year			
	1	2	3	4
2	2.3	1.9	2.0	2.0
3	2.3	1.9	1.9	1.8
4	2.1	1.8	2.0	1.8
5	1.6	1.8	1.6	1.6
6	1.8	1.8	2.1	1.8
7	1.8	2.2	2.0	1.9
8	1.8	1.4	1.9	1.7
9	1.6	1.6	1.3	1.3
10	1.3	1.5	1.1	1.0

TABLE 19

Mean Scores by Grade for Completeness of Instructional Package - Language Arts

Grade	Year 1	2	3	4
2		2.1	2.0	2.1
3		2.1	1.9	2.1
4		2.1	1.9	2.0
5		1.8	1.9	1.8
6		1.9	2.1	2.0
7		2.0	2.0	2.1
8		2.1	2.0	2.1
9		2.0	2.0	2.0
10		2.2	2.1	1.9

TABLE 20

Mean Scores by Grade for Completeness of Instructional Package - Math

Grade	Year 1	2	3	4
2		2.1	2.1	2.1
3		2.1	1.9	2.1
4		2.1	1.9	2.0
5		1.8	2.0	1.9
6		2.0	2.2	2.1
7		2.4	2.2	2.2
8		2.1	2.2	2.3
9		1.9	2.0	2.0
10		2.1	2.1	1.9

TABLE 21

Mean Scores by Grade for Utilization of Student Evaluation - Language Arts

Grade	Year			
	1	2	3	4
2		2.4	2.3	2.3
3		2.4	2.3	2.3
4		2.4	2.2	2.4
5		2.3	2.5	2.5
6		2.4	2.7	2.6
7		2.3	2.4	2.3
8		2.5	2.7	2.5
9		2.1	2.2	1.5
10		2.3	2.5	1.9

TABLE 22

Mean Scores by Grade for Utilization of Student Evaluation - Math

Grade	Year			
	1	2	3	4
2		2.3	2.3	2.3
3		2.3	2.3	2.3
4		2.3	2.2	2.4
5		2.3	2.5	2.6
6		2.4	2.7	2.7
7		2.4	2.4	2.4
8		2.3	2.6	2.4
9		1.9	2.3	2.0
10		2.5	2.5	2.4

TABLE 23

Mean Scores by Scale for
Grade 3 - Language Arts

Name of Scale	Year 1	Year 2	Year 3	Year 4
Utilization of Objectives	2.6	2.7	2.3	2.6
Individualization in Decision Making	1.5	1.4	1.5	1.4
Teacher or Locally Developed Materials	1.5	1.5	1.8	1.6
Individualization of Instructional Pace	2.1	2.2	2.2	2.1
Scheduling Characteristics	1.9	1.7	1.8	1.9
Use of Performance Agreements	1.9	1.6	1.5	1.5
Classroom Group Organization	2.2	2.3	2.3	2.4
Teaching Unit Composition	2.3	2.0	1.8	1.9
Completeness of Instructional Package		2.1	1.9	2.1
Utilization of Student Evaluation		2.4	2.3	2.3

TABLE 24

Mean Scores by Scale for Grade 3 - Math

Name of Scale	Year 1	Year 2	Year 3	Year 4
Utilization of Objectives	2.6	2.7	2.3	2.6
Individualization in Decision Making	1.5	1.4	1.5	1.3
Teacher or Locally Developed Materials	1.4	1.4	1.8	1.9
Individualization of Instructional Pace	2.2	2.2	2.2	2.1
Scheduling Characteristics	1.9	1.7	1.8	1.8
Use of Performance Agreements	2.0	1.6	1.5	1.5
Classroom Group Organization	2.1	2.2	2.4	2.4
Teaching Unit Composition	2.3	1.9	1.9	1.8
Completeness of Instructional Package		2.1	1.9	2.1
Utilization of Student Evaluation		2.3	2.3	2.3

TABLE 25

Mean Scores by Scale for Grade 5 - Language Arts

Name of Scale	Year 1	Year 2	Year 3	Year 4
Utilization of Objectives	2.2	2.1	2.3	2.4
Individualization in Decision Making	1.4	1.2	1.4	1.2
Teacher or Locally Developed Materials	1.7	1.7	1.8	1.7
Individualization of Instructional Pace	1.9	1.9	1.9	1.9
Scheduling Characteristics	1.7	1.4	1.6	1.5
Use of Performance Agreements	1.7	1.5	1.6	1.5
Classroom Group Organization	1.9	1.8	2.1	2.0
Teaching Unit Composition	1.7	1.8	1.6	1.7
Completeness of Instructional Package		1.8	1.9	1.8
Utilization of Student Evaluation		2.3	2.5	2.5

TABLE 26

Mean Scores by Scale for Grade 5 - Math

Name of Scale	Year 1	Year 2	Year 3	Year 4
Utilization of Objectives	2.0	2.1	2.3	2.4
Individualization in Decision Making	1.4	1.3	1.2	1.2
Teacher or Locally Developed Materials	1.8	1.7	1.8	1.8
Individualization of Instructional Pace	1.8	1.8	1.9	1.9
Scheduling Characteristics	1.7	1.4	1.5	1.5
Use of Performance Agreements	1.7	1.6	1.7	1.6
Classroom Group Organization	1.9	1.9	1.9	2.1
Teaching Unit Composition	1.6	1.8	1.6	1.6
Completeness of Instructional Package		1.8	2.0	1.9
Utilization of Student Evaluation		2.3	2.5	2.6

TABLE 27

Mean Scores by Scale for Grade 7 - Language Arts

Name of Scale	Year 1	Year 2	Year 3	Year 4
Utilization of Objectives	2.8	2.2	2.6	2.6
Individualization in Decision Making	1.5	1.3	1.4	1.4
Teacher or Locally Developed Materials	2.1	2.2	2.3	2.3
Individualization of Instructional Pace	2.1	2.1	2.1	2.0
Scheduling Characteristics	1.9	1.6	1.7	1.5
Use of Performance Agreements	1.8	1.5	2.1	2.1
Classroom Group Organization	2.3	2.0	2.0	1.9
Teaching Unit Composition	1.9	1.8	2.0	1.9
Completeness of Instructional Package		2.0	2.0	2.1
Utilization of Student Evaluation		2.3	2.4	2.3

TABLE 28

Mean Scores by Scale for Grade 7 - Math

Name of Scale	Year 1	Year 2	Year 3	Year 4
Utilization of Objectives	2.7	2.5	2.8	2.7
Individualization in Decision Making	1.3	1.4	1.2	1.3
Teacher or Locally Developed Materials	1.9	2.1	2.3	2.3
Individualization of Instructional Pace	2.0	2.3	2.4	2.3
Scheduling Characteristics	1.7	1.5	1.6	1.5
Use of Performance Agreements	1.9	2.1	2.4	2.4
Classroom Group Organization	2.0	2.2	2.1	1.9
Teaching Unit Composition	1.8	2.2	2.0	1.9
Completeness of Instructional Package		2.4	2.2	2.2
Utilization of Student Evaluation		2.4	2.4	2.4

TABLE 29

Mean Scores by Scale for Grade 9 - Language Arts

Name of Scale	Year 1	Year 2	Year 3	Year 4
Utilization of Objectives	2.8	2.5	2.5	1.9
Individualization in Decision Making	1.6	1.2	1.3	1.3
Teacher or Locally Developed Materials	1.9	2.0	2.2	2.2
Individualization of Instructional Pace	2.0	1.6	1.8	1.6
Scheduling Characteristics	1.5	1.2	1.2	1.2
Use of Performance Agreements	1.8	1.6	1.4	1.4
Classroom Group Organization	2.0	2.0	1.8	1.8
Teaching Unit Composition	1.6	1.6	1.8	1.6
Completeness of Instructional Package		2.0	2.0	2.0
Utilization of Student Evaluation		2.1	2.2	1.5

TABLE 30

Mean Scores by Scale for Grade 9 - Math

Name of Scale	Year 1	Year 2	Year 3	Year 4
Utilization of Objectives	2.5	2.3	2.7	2.3
Individualization in Decision Making	1.4	1.2	1.3	1.3
Teacher or Locally Developed Materials	1.8	2.0	2.0	2.1
Individualization of Instructional Pace	1.8	1.8	2.2	2.2
Scheduling Characteristics	1.5	1.2	1.2	1.2
Use of Performance Agreements	1.8	1.6	1.6	1.6
Classroom Group Organization	1.8	1.8	2.2	2.0
Teaching Unit Composition	1.6	1.6	1.3	1.3
Completeness of Instructional Package		1.9	2.0	2.0
Utilization of Student Evaluation		1.9	2.3	2.0

TABLE 31

Mean Scores by Scale for Grade 10 - Language Arts

Name of Scale	Year 1	Year 2	Year 3	Year 4
Utilization of Objectives	2.3	2.8	2.9	2.7
Individualization in Decision Making	1.3	1.7	1.4	1.5
Teacher or Locally Developed Materials	1.7	2.1	2.1	1.9
Individualization of Instructional Pace	1.7	1.7	1.6	1.6
Scheduling Characteristics	1.3	1.7	1.6	1.4
Use of Performance Agreements	2.0	1.5	1.4	1.6
Classroom Group Organization	1.7	2.2	2.0	1.8
Teaching Unit Composition	1.3	1.8	1.3	1.4
Completeness of Instructional Package		2.2	2.1	1.9
Utilization of Student Evaluation		2.3	2.5	1.9

TABLE 32

Mean Scores by Scale for Grade 10 - Math

Name of Scale	Year 1	Year 2	Year 3	Year 4
Utilization of Objectives	1.7	2.6	2.6	2.5
Individualization in Decision Making	1.2	1.5	1.3	1.3
Teacher or Locally Developed Materials	1.7	1.8	1.8	1.8
Individualization of Instructional Pace	1.7	2.2	1.8	1.8
Scheduling Characteristics	1.3	1.6	1.6	1.5
Use of Performance Agreements	2.0	1.4	1.2	1.5
Classroom Group Organization	1.3	2.0	2.0	1.8
Teaching Unit Composition	1.3	1.5	1.1	1.0
Completeness of Instructional Package		2.1	2.1	1.9
Utilization of Student Evaluation		2.5	2.5	2.4

APPENDIX IV-B

Approaches to Individualization:
Toward a Typology of Innovative Educational Practices[*]

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[*] Coles, G. J. Approaches to individualization: Toward a typology of innovative educational practices. Paper presented at the 1975 annual meeting of the American Educational Research Association, Washington, D.C.

APPROACHES TO INDIVIDUALIZATION:

TOWARD A TYPOLOGY OF INNOVATIVE EDUCATIONAL PRACTICES*

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*A presentation given at the 1975 annual meeting of the American Educational Research Association, Washington, D. C.

Approaches to Individualization:
Toward a Typology of Innovative Educational Practices

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American Institutes for Research

Introduction

During the 1970-71 school year, the American Institutes for Research (AIR) began full implementation of a U. S. Office of Education (USOE) sponsored longitudinal study of intensive, innovative education practices. The purpose of this project was to examine over a three-year period the relative effectiveness of various educational experiences or treatments. It was anticipated that these data would provide a valuable source of information that could be used in designing new educational programs and research efforts in the years ahead. This paper will discuss the general design and research goals of this study, the Longitudinal Study of Educational Practices (Project LONGSTEP) and then review the methodology used (1) to gather the study's treatment data and (2) to create treatment types representing the approaches to individualized instruction present in participating schools.

Introduction to Project LONGSTEP

The objective of Project LONGSTEP was to determine as comprehensively as possible over a three-year period (1) the relationships between selected innovative education treatments and student achievement and attitudes, and (2) the components of these treatments which have had the greatest impact on student outcomes. To realize this goal, the general design of the study involved the collection of three major categories of data each school year: (1) educational treatment data, composed of variables which measure the educational environment of which the student is a member, including

(a) characteristics of the educational program(s) in which each student participates and (b) characteristics of each student's teacher(s); (2) student characteristics (e.g., sex, socioeconomic status) brought by the student into his educational environment; and (3) student outcomes, including both cognitive and attitudinal outcome variables. Student data were obtained from specially designed student questionnaires yielding background information and attitudinal outcome measures and from standardized achievement tests yielding cognitive outcome variables. Teacher data were obtained from a questionnaire completed by each teacher. Educational treatments were documented by AIR staff via information gathered from interviews with principals and teachers, from classroom observations and from existing documentation of the treatment. Lastly, information identifying each student's teachers (by subject) was obtained and used to relate specific treatment and teacher data to individual students.

Since schools participated in Project LONGSTEP on a purely voluntary basis, it was not feasible to randomly assign students or student groups to treatment conditions; nor was it possible for AIR to systematically vary the treatments present in any given school. Rather, variation among the primary independent variables of the study was achieved through the selection of existing school programs. Thus, the schools invited to participate voluntarily in the study were chosen because, as a group, they represented a range of innovative practices and because they also varied with respect to other educationally relevant characteristics (e.g., socioeconomic level). Approximately 30,000 students, 1,500 teachers and 80 schools in 13 school districts located throughout the United States eventually participated in Project LONGSTEP during its three years of data collection (1970-71, 1971-72 and 1972-73).

Treatment Data Collection Methodology

Educational programs are composed of numerous related and unrelated processes or treatment components. For this reason, it was necessary to develop a system by which complex educational experiences present in the diverse sample of participating schools could be described and quantified with respect to specific observable educational characteristics. An Educational Experience Analysis Guide (EdExAG) was developed for this purpose. This guide provided the conceptual scheme and the practical questions and alternative responses that AIR project personnel could use in documenting the specific experiences of the students participating in the study. This guide, consisting of more than 80 items, was designed so that for each item it was possible to code the basic components or elements underlying a treatment on a continuum from "traditional" to "innovative." Quantitative measures of educational "treatment" derived from this guide could then be associated with participating students, regardless of the schools which they attended.

The data collection unit for educational treatment data was a flexibly defined entity called an Educational Experience Analysis Guide group or EdExAG group. Different EdExAG groups were identified within a school when an AIR site visitor could differentiate among the treatments received by different groups of students at a school by means of items found on the EdExAG. Defined in this manner, EdExAG groups could include as few students as those within one teacher's class for one subject matter area or as many students as those in all grades within a school for all subject matter areas of instruction. EdExAG groups, then, were created in response to treatment variations that existed within a school and within a grade and may be more or less viewed as an efficient but group-level approximation to the documentation of each individual student's educational treatment.

During the 1970-71 school year, this treatment documentation methodology led to the identification of 141 such EdExAG groups, while 167 and 228 groups were isolated during 1971-72 and 1972-73 respectively. These groups, then, represented all of the different kinds of educational treatments that were provided by the schools to which students participating in Project LONGSTEP were exposed during each year of the project.

Measures of Educational Experiences

Prior to initiating analyses utilizing the EdExAG data, senior project staff who were familiar with the sites participating in the study and with educational program organization in general critically inspected each EdExAG item. Those items or combinations of items (i.e., tentative multi-item scales) were identified that would quantify what were judged to be the basic educational characteristics underlying the educational practices and procedures included in the study. Item and scale analysis procedures were then undertaken so that the measurement properties of the EdExAG items and the tentative scales might be examined.

The first step in the item/scale analyses of the EdExAG was to rank order the alternatives for each of the items on an a priori scale from lesser to greater innovativeness. Senior-level project staff then examined the intercorrelations among the items to confirm that scale items were more highly related to other items in the same scale than to items measuring different constructs. Final scale content was determined by considering these empirical relationships and by reaffirming that the items were measuring what were judged to be the same educational construct on a priori grounds. Last, the internal consistency of each multi-item scale was computed to provide some estimate of the reliability of the measurement provided by each scale. Cronbach's (1951) coefficient alpha (α) was used for this purpose. Coefficients for the multi-item scales ranged from .54 to .82.

The Concept of the Treatment Group

For purposes of collecting treatment information during site visits to participating schools, educational treatments could not be defined independently of the school at which the information was obtained. A site visitor, for example, could only document educational experiences of the students in the participating school he or she was visiting, thereby identifying what have been called EdExAG groups. The data gathered at this stage, then, differentiated among groups of participating students within the same school who were exposed to different educational practices. Defined in this limited manner, a treatment could include, at most, all the students in a single school, provided that all these students had similar educational experiences.

It was originally thought, however, that EdExAG groups defined by this approach would not represent educationally unique configurations of practices. Some of the small, nonsystematic differences describing the EdExAG groups in each school could be educationally trivial or represent inaccuracies in documentation. Similarly, groups characterized by supposedly identical educational practices may not represent exactly the same treatment due to the lack of discriminability of the items on the EdExAG.

Considerations such as these, coupled with a concern that the project's analyses should focus on a limited number of educationally meaningful and identifiable student groups, suggested that students should be combined into larger analytic units based upon the similarity of their educational experiences. Such a group was called a treatment group or treatment unit. Examination of achievement and attitude differences among such groups would then provide insights concerning the efficacy of the combinations of practices they involved.

Cluster Analysis Methodology

Combining EdExAG groups into larger analytic units representing different "types" of educational approaches was accomplished by means of a cluster analysis procedure based upon Q-type factor analysis. Separate analyses were conducted for the data collected each year and for language arts (n = 92, 1971-72; n = 103, 1972-73) and mathematics (n = 89, 1971-72; n = 93, 1972-73) groups separately.

Since the objectives of these analyses were to create a limited number of distinct but educationally meaningful treatment "types," it was first necessary to define the variable space within which combinations of EdExAG groups were to be identified. Although it would have been possible to quantify differences/similarities among EdExAG groups with respect to all 25 EdExAG scales, it was decided that the clusters derived would be more interpretable and meaningful if the scales used represented measures of the same underlying educational construct. Furthermore, if these scales described what were considered to be major differences in educational approaches, the clusters identified would represent a parsimonious number of types of treatments which were maximally different with respect to these key treatment components. For this reason, the 10 EdExAG scales which indexed some of the major ways in which project schools were individualizing instruction were selected to be the profile elements describing the approach of each EdExAG group. The 10 scales were: Utilization of Objectives, Individualization in Decision Making, Teacher or Locally Developed Materials, Individualization of Instructional Pace, Scheduling Characteristics, Use of Performance Agreements, Classroom Group Organization, Teaching Unit Composition, Completeness of Instructional Package, and Utilization of Student Evaluation. These scales were chosen (1) because they represented ways in which sample schools were achieving some degree of individualization; (2) because one of the criteria used in selecting schools for participation in the project was individualization, and (3) because these scales documented some of the major process dimensions that are of current interest in education.

Next, each of the EdExAG scale scores was transformed to a deviation score by subtracting the scale mean (computed across all EdExAG groups in the analysis). A Q-type average cross-products matrix was then computed to provide a multivariate measure of the similarity of each EdExAG group with every other group with respect to the 10 individualization scales. Both Nunnally (1967, pp. 372-388) and Overall and Klett (1972, pp. 180-239) have discussed such vector-product measures of similarity and have noted that they are particularly useful indices since they can be subjected to rather "powerful" methods of analysis such as factor analysis.

Each Q-type average cross-product matrix was subjected to a principal factors analysis in which each diagonal value was the average cross-product of an entity (i.e., EdExAG group) or profile with itself. Four factors were extracted in each analysis and rotated to a varimax criterion. This number of factors was specified since four factors accounted for 71% or more of the trace (sum of the diagonal elements) of each matrix, and since a relatively parsimonious solution was desired and since the number of categories created was expected to be two times the number of factors.

For purposes of defining cluster membership, these Q-type factors were viewed as "ideal types" of treatments. EdExAG groups were assigned to one of eight clusters on the basis of the rotated factor on which each was loaded most highly (in terms of absolute value) and on the basis of the sign of that loading.

In order to interpret the educational characteristics of the groups that were formed, the EdExAG scale scores in the original data matrix were converted to standard scores and the mean and standard deviation of the EdExAG groups included in each cluster were computed. A profile for each cluster was plotted, each element being equal to the mean standard score for all EdExAG groups comprising the cluster.

Discussion of Cluster Results

Project LONGSTEP staff who were familiar with the schools and EdExAG groups present in the study inspected the mean profiles which had been plotted. The most obvious trend in all of these mean profiles was the fact that clusters defined as being positively and negatively related to the same "ideal treatment type" (i.e., bipolar Q-type factor) tended to have profiles which were mirror images of each other. Secondly, the highest loading for about one-half of the EdExAG groups was on the first Q-type factor and for this reason, the largest cluster groups were those defined by that factor. Third, the treatment approaches defined by the first factor were, for both school years, a generally "innovative" group and a fairly "traditional" group. Fourth, although there were some similarities of profiles across years, the combinations of approaches represented by the groups defined from the last three Q-type factors were very complex and, in general, did not exist for two consecutive school years. Last, examination of the profiles by staff familiar with each of the EdExAG groups from which the clusters were created confirmed that these groups more-or-less reflected the kinds of approaches actually present in the schools. The most valuable result of these procedures, however, did not become apparent until the cluster codes were attached to individual students and until student membership in the various combinations of two-year "treatment" paths were examined.

As noted earlier, the Educational Experience Analysis Guide groups identified during each school year represented the population of different kinds of educational approaches to which participating students were exposed in a given school year. EdExAG groups were not defined on a longitudinal basis because the students in the same EdExAG group on 1971-72 (e.g., Mrs. Jones, 4th grade language arts class) were not necessarily in the same EdExAG group the next year. For this reason, each individual student's EdExAG group membership was attached to his record. Following the cluster analyses described above EdExAG group codes were used to create for each student a treatment group code for language arts for [illegible]2 and for 1972-73. Cross-tabulations of these two codes were then run to show the numbers of students following each of the possible longitudinal treatment paths.

Examination of these tabulations showed that very few students followed a longitudinal combination of treatments that involved either "generally innovative" (≈ 13%) or "generally traditional" (≈ 8%). Since the nature of the other treatment types present during each year was complex (though meaningful) and since longitudinal movement of students across years was also very complicated, the analysis of the impact of such complex patterns of educational treatments over time would tend to produce results which would not be amenable to meaningful interpretation. For this reason, the typological approach to the analysis of the Project LONGSTEP data base was reconsidered. The paper will conclude with a review of the conclusions reached.

Although the concept of a typology based upon approaches to individualization is extremely appealing from both an educational and analytic point of view, the results described above more-or-less demonstrated some of the shortcomings of such a procedure. First, it is possible that the variables used to describe EdExAG group similarities (i.e., the EdExAG scales) were unstable indices of the constructs they purported to measure. This is unlikely, however, since the same project personnel visited the same schools in both years and since treatment documentation in 1972-73 was based upon noting changes from the previous years. It is more likely that the 1972-73 EdExAG data underestimated changes (and were more stable than they should have been).

Second, the treatment "types" identified tended to be very complex combinations of component practices and procedures, with the exception of the "generally innovative" and "generally traditional" groups developed from the first Q-type factor. There are at least two possible explanations for these results: (1) since the project schools were selected to represent a wide range of educational approaches, stable groups could not be identified because the sample was both small and very heterogeneous; and (2) the clustering method used was not appropriate to these kinds of data.

In order to determine if the clustering results were a function of the methodology utilized, the data matrices used in the 1971-72 and 1972-73 language arts analyses were converted to orthogonal principal component scores. Squared distances among EdExAG groups were computed and used to cluster the EdExAG groups by means of Ward's (1963) hierarchical grouping procedure (Veldman, 1967). Although the mean profiles for a number of clusters were similar (most notably, the "generally traditional" cluster), there were still substantial differences between the groups created by the two techniques. The hierarchical groups, however, were equally complex and the longitudinal treatment paths of students based on the clusters were also complicated. These trends suggested that the cluster results obtained were somewhat method dependent.

This combination of findings also suggested additional explanations for our observations. It was quite likely (a) that the kinds of educational experiences available to sixth graders were different from those available to fifth graders and/or (b) that the practices and procedures themselves had changed. Of these two, changes in educational practices over time probably provides the most adequate explanation. At an experiential level, at least, numerous site visitors have noted substantial changes in program components over the course of this study--innovation, then, appears to be as much a process as it is a unique set of school practices. In spite of a number of methodological limitations, the cluster results reported in this paper more-or-less led to the same conclusion.

These results also imply that future attempts to develop typologies of innovative practices that are stable across school years and for different samples of schools may not meet with much success.

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APPENDIX IV-C

Means, Standard Deviations and Intercorrelations for the Test Variables, Percentage of School Year Completed Prior to Test Administration, and SES*

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*Abbreviations:

PCT71	Percentage of School Year Completed Prior to Testing, Spring 1971
PCT72	Percentage of School Year Completed Prior to Testing, Spring 1972
PCT73	Percentage of School Year Completed Prior to Testing, Spring 1973
MAL71	CTMM Mental Age - Language, Spring 1971
MANL71	CTMM Mental Age - Non-Language, Spring 1971
RTOT71, LTOT71, ATOT71	CTBS Reading Total, Language Total and Arithmetic Total Score for Spring 1971
RTOT72, LTOT72, ATOT72	CTBS Reading Total, Language Total and Arithmetic Total Score for Spring 1972
RTOT73, LTOT73, ATOT73	CTBS Reading Total, Language Total and Arithmetic Total Score for Spring 1973
SES	Student Socioeconomic Status

TABLE 1

Cohort 1, Spring 1972
Reading Total Score Analysis (N = 791)

Variable	Mean	Std.Dev.	Correlations PCT71	 MAL71	 PCT72	 RTOT72	 SES
PCT71	75.45	4.60	-	.22	.65	.23	.46
MAL71	93.85	10.82	.22	-	.26	.42	.26
PCT72	75.83	3.59	.65	.26	-	.09	.09
RTOT72	339.97	63.61	.23	.42	.09	-	.41
SES	100.03	10.02	.46	.26	.09	.41	-

TABLE 2

Cohort 1, Spring 1973
Reading Total Score Analysis (N = 767)

Variable	Mean	Std.Dev.	Correlations PCT72	 RTOT72	 PCT73	 RTOT73	 SES
PCT72	75.93	3.76	-	.06	-.04	.08	.10
RTOT72	338.46	63.99	.06	-	.22	.75	.41
PCT73	79.95	4.48	-.04	.22	-	.17	.50
RTOT73	400.66	67.25	.08	.75	.17	-	.35
SES	100.59	9.94	.10	.41	.50	.35	-

TABLE 3

Cohort 4, Spring 1972
Reading Total Score Analysis (N = 1952)

Variable	Mean	Std.Dev.	Correlations				
			PCT71	RTOT71	PCT72	RTOT72	SES
PCT71	78.50	6.78	-	.03	.71	.02	-.05
RTOT71	437.91	64.28	.03	-	-.02	.84	.34
PCT72	75.22	4.93	.71	-.02	-	-.01	-.08
RTOT72	469.51	68.67	.02	.84	-.01	-	.37
SES	99.39	9.93	-.05	.34	-.08	.37	-

TABLE 4

Cohort 4, Spring 1973
Reading Total Score Analysis (N = 1925)

Variable	Mean	Std.Dev.	Correlations				
			PCT72	RTOT72	PCT73	RTOT73	SES
PCT72	75.49	5.06	-	-.03	.69	-.10	-.09
RTOT72	475.72	67.33	-.03	-	.02	.85	.38
PCT73	77.05	5.72	.69	.02	-	.01	.18
RTOT73	507.40	76.15	-.10	.85	.01	-	.39
SES	99.74	9.90	-.09	.38	.18	.39	-

TABLE 5

Cohort 6, Spring 1972
Reading Total Score Analysis (N = 1520)

Variable	Mean	Std.Dev.	Correlations				
			PCT71	RTOT71	PCT72	RTOT72	SES
PCT71	77.20	6.65	-	-.05	.72	-.02	.09
RTOT71	513.29	72.86	-.05	-	-.03	.86	.31
PCT72	73.85	5.83	.72	-.03	-	-.02	.00
RTOT72	531.27	77.74	-.02	.86	-.02	-	.34
SES	99.50	9.92	.09	.31	.00	.34	-

TABLE 6

Cohort 6, Spring 1973
Reading Total Score Analysis (N = 1552)

Variable	Mean	Std.Dev.	Correlations				
			PCT72	RTOT72	PCT73	RTOT73	SES
PCT72	73.91	5.69	-	-.01	.66	-.00	-.00
RTOT72	545.44	72.79	-.01	-	.09	.86	.36
PCT73	76.09	6.45	.66	.09	-	.15	.25
RTOT73	563.34	84.84	-.00	.86	.15	-	.37
SES	100.08	9.72	-.00	.36	.25	.37	-

TABLE 7

Cohort 1, Spring 1972
Language Total Score Analysis (N = 787)

Variable	Mean	Std.Dev.	Correlations PCT71	 MAL71	 PCT72	 LTOT72	 SES
PCT71	75.38	4.52	-	.21	.65	.23	.46
MAL71	93.83	10.82	.21	-	.26	.42	.25
PCT72	75.79	3.58	.65	.26	-	.10	.07
LTOT72	334.31	63.67	.23	.42	.10	-	.38
SES	100.05	9.99	.46	.25	.07	.38	-

TABLE 8

Cohort 1, Spring 1973
Language Total Score Analysis (N = 755)

Variable	Mean	Std.Dev.	Correlations PCT72	 LTOT72	 PCT73	 LTOT73	 SES
PCT72	75.89	3.76	-	.07	-.06	.05	.09
LTOT72	334.06	65.06	.07	-	.22	.80	.39
PCT73	79.95	4.48	-.06	.22	-	.21	.49
LTOT73	400.00	69.59	.05	.80	.21	-	.33
SES	100.62	9.92	.09	.39	.49	.33	-

TABLE 9

Cohort 4, Spring 1972
Language Total Score Analysis (N = 1995)

Variable	Mean	Std.Dev.	Correlations				
			PCT71	LTOT71	PCT72	LTOT72	SES
PCT71	78.48	6.78	-	.07	.71	.04	-.04
LTOT71	437.52	66.19	.07	-	.05	.82	.28
PCT72	75.21	4.96	.71	.05	-	.00	-.07
LTOT72	476.31	76.27	.04	.82	.00	-	.34
SES	99.56	9.97	-.04	.28	-.07	.34	-

TABLE 10

Cohort 4, Spring 1973
Language Total Score Analysis (N = 1902)

Variable	Mean	Std.Dev.	Correlations				
			PCT72	LTOT72	PCT73	LTOT73	SES
PCT72	75.46	5.08	-	.01	.69	-.04	.31
LTOT72	480.54	72.24	.01	-	.06	.84	.31
PCT73	77.03	5.74	.69	.06	-	.02	.18
LTOT73	510.72	75.76	-.04	.84	.02	-	.30
SES	99.78	9.88	.31	.31	.18	.30	-

TABLE 11

Cohort 6, Spring 1972
Language Total Score Analysis (N = 1491)

Variable	Mean	Std.Dev.	Correlations PCT71	 LTOT71	 PCT72	 LTOT72	 SES
PCT71	77.18	6.68	-	-.07	.72	-.01	.08
LTOT71	518.89	69.75	-.07	-	-.05	.80	.22
PCT72	73.78	5.85	.72	-.05	-	-.00	-.00
LTOT72	528.91	80.09	-.01	.80	-.00	-	.24
SES	99.55	9.94	.08	.22	-.00	.24	-

TABLE 12

Cohort 6, Spring 1973
Language Total Score Analysis (N = 1507)

Variable	Mean	Std.Dev.	Correlations PCT72	 LTOT72	 PCT73	 LTOT73	 SES
PCT72	73.87	5.69	-	.01	.65	.05	-.01
LTOT72	545.33	73.99	.01	-	.08	.82	.26
PCT73	76.12	6.47	.65	.08	-	.15	.24
LTOT73	561.67	82.30	.05	.82	.15	-	.29
SES	100.21	9.79	-.01	.26	.24	.29	-

TABLE 13

Cohort 1, Spring 1972
Arithmetic Total Score Analysis (N = 752)

			Correlations				
Variable	Mean	Std.Dev.	PCT71	MANL71	PCT72	ATOT72	SES
PCT71	75.41	4.60	-	.17	.66	.27	.47
MANL71	93.83	12.30	.17	-	.13	.43	.25
PCT72	75.89	3.57	.66	.13	-	.21	.09
ATOT72	320.02	39.80	.27	.43	.21	-	.35
SES	99.80	9.92	.47	.25	.09	.35	-

TABLE 14

Cohort 1, Spring 1973
Arithmetic Total Score Analysis (N = 741)

			Correlations				
Variable	Mean	Std.Dev.	PCT72	ATOT72	PCT73	ATOT73	SES
PCT72	76.04	3.81	-	.19	-.04	.03	.07
ATOT72	319.15	38.14	.19	-	.10	.72	.33
PCT73	79.91	4.44	-.04	.10	-	.08	.48
ATOT73	377.79	42.56	.03	.72	.08	-	.27
SES	100.49	9.88	.07	.33	.48	.27	-

TABLE 15

Cohort 4, Spring 1972
Arithmetic Total Score Analysis (N = 1943)

Variable	Mean	Std.Dev.	Correlations				
			PCT71	ATOT71	PCT72	ATOT72	SES
PCT71	78.41	6.78	-	.03	.71	.00	-.05
ATOT71	404.69	37.69	.03	-	-.01	.79	.29
PCT72	75.15	4.97	.71	-.01	-	-.04	-.08
ATOT72	446.66	56.48	.00	.79	-.04	-	.30
SES	99.26	9.94	-.05	.29	-.08	.30	-

TABLE 16

Cohort 4, Spring 1973
Arithmetic Total Score Analysis (N = 1964)

Variable	Mean	Std.Dev.	Correlations				
			PCT72	ATOT72	PCT73	ATOT73	SES
PCT72	75.56	5.03	-	-.02	.69	-.10	.01
ATOT72	449.44	56.08	-.02	-	.08	.81	.01
PCT73	77.16	5.70	.69	.08	-	-.05	.07
ATOT73	480.84	61.66	-.10	.81	-.05	-	.07
SES	99.55	9.97	-.06	.30	.22	.30	-

TABLE 17

Cohort 6, Spring 1972
Arithmetic Total Score Analysis (N = 1443)

Variable	Mean	Std.Dev.	Correlations				
			PCT71	ATOT71	PCT72	ATOT72	SES
PCT71	77.17	6.77	-	-.01	.73	.03	.08
ATOT71	487.21	55.35	-.01	-	-.04	.82	.30
PCT72	73.86	5.93	.73	-.04	-	-.05	-.01
ATOT72	510.30	72.60	.03	.82	-.05	-	.29
SES	99.10	9.79	.08	.30	-.01	.29	-

TABLE 18

Cohort 6, Spring 1973
Arithmetic Total Score Analysis (N = 1505)

Variable	Mean	Std.Dev.	Correlations				
			PCT72	ATOT72	PCT73	ATOT73	SES
PCT72	73.86	5.71	-	-.02	.66	.01	-.03
ATOT72	517.17	66.73	-.02	-	-.04	.85	.27
PCT73	75.98	6.47	.66	-.04	-	.06	.24
ATOT73	537.81	74.08	.01	.85	.06	-	.30
SES	99.74	9.67	-.03	.27	.24	.30	-

APPENDIX IV-D

Scatterplots of the Residuals about the Posttest on Pretest Regression Line Plotted on Predicted Posttest[*]

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[*] On each graph, one occurrence is represented by an asterisk, two to nine occurrences by the numbers 2 to 9, and more than nine occurrences by a 9.

IV-D-1

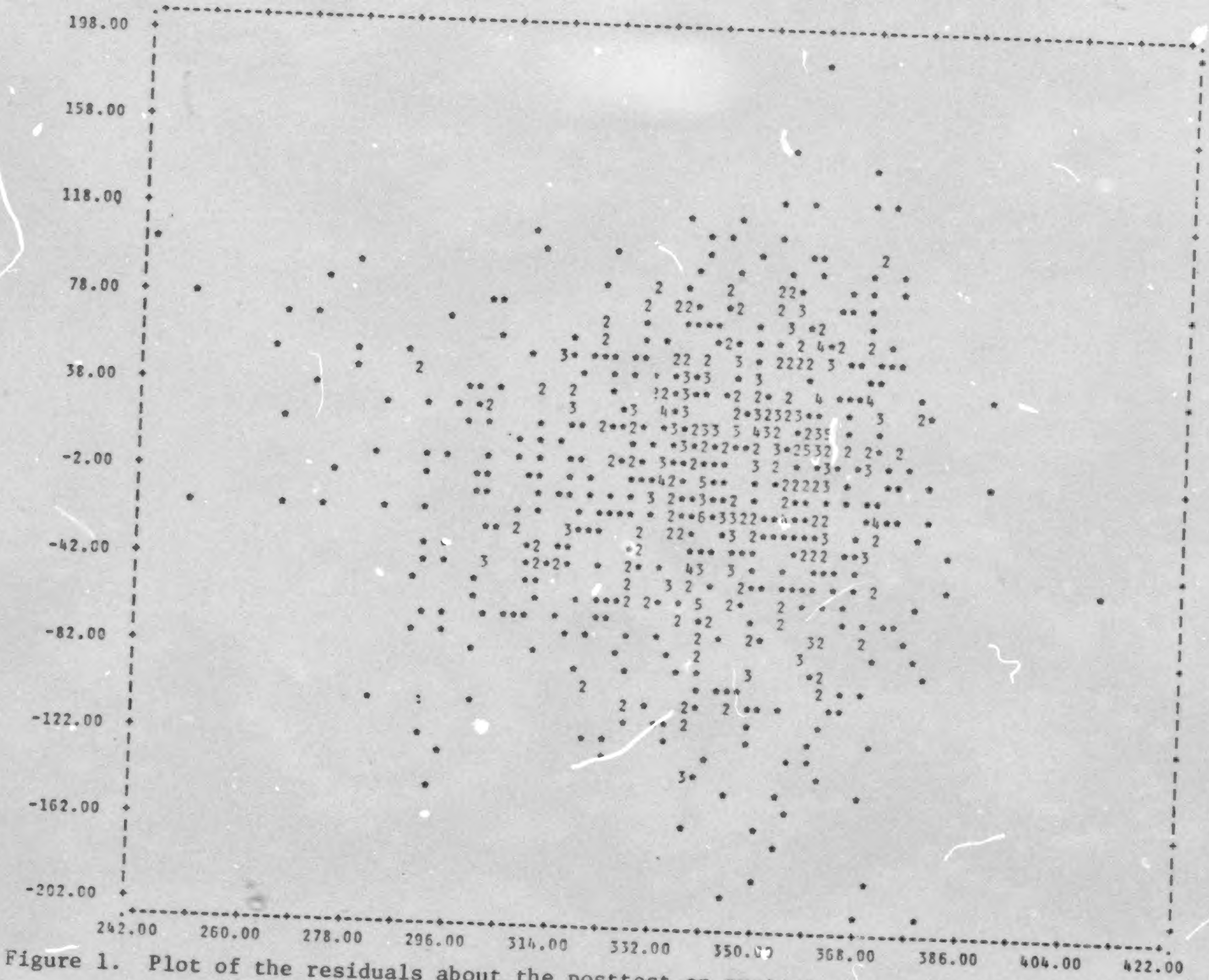

Figure 1. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest ($\hat{Y}$)--Cohort 1, Spring 1972 Reading Total Score Analysis (vertical axis = Y'; horizontal axis = $\hat{Y}$).

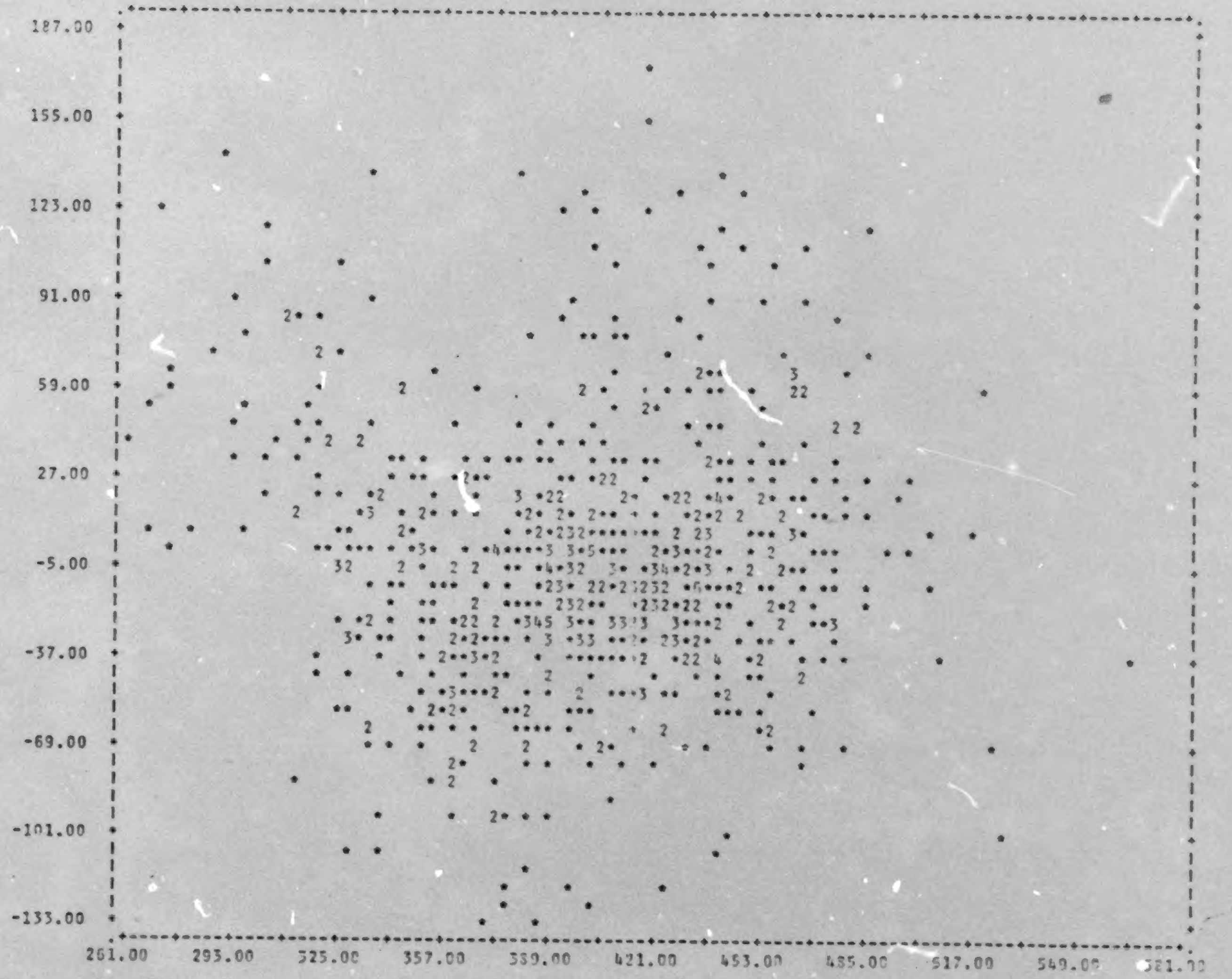

Figure 2. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest ($\hat{Y}$)--Cohort 1, Spring 1973 Reading Total Score Analysis (vertical axis = Y'; horizontal axis = $\hat{Y}$).

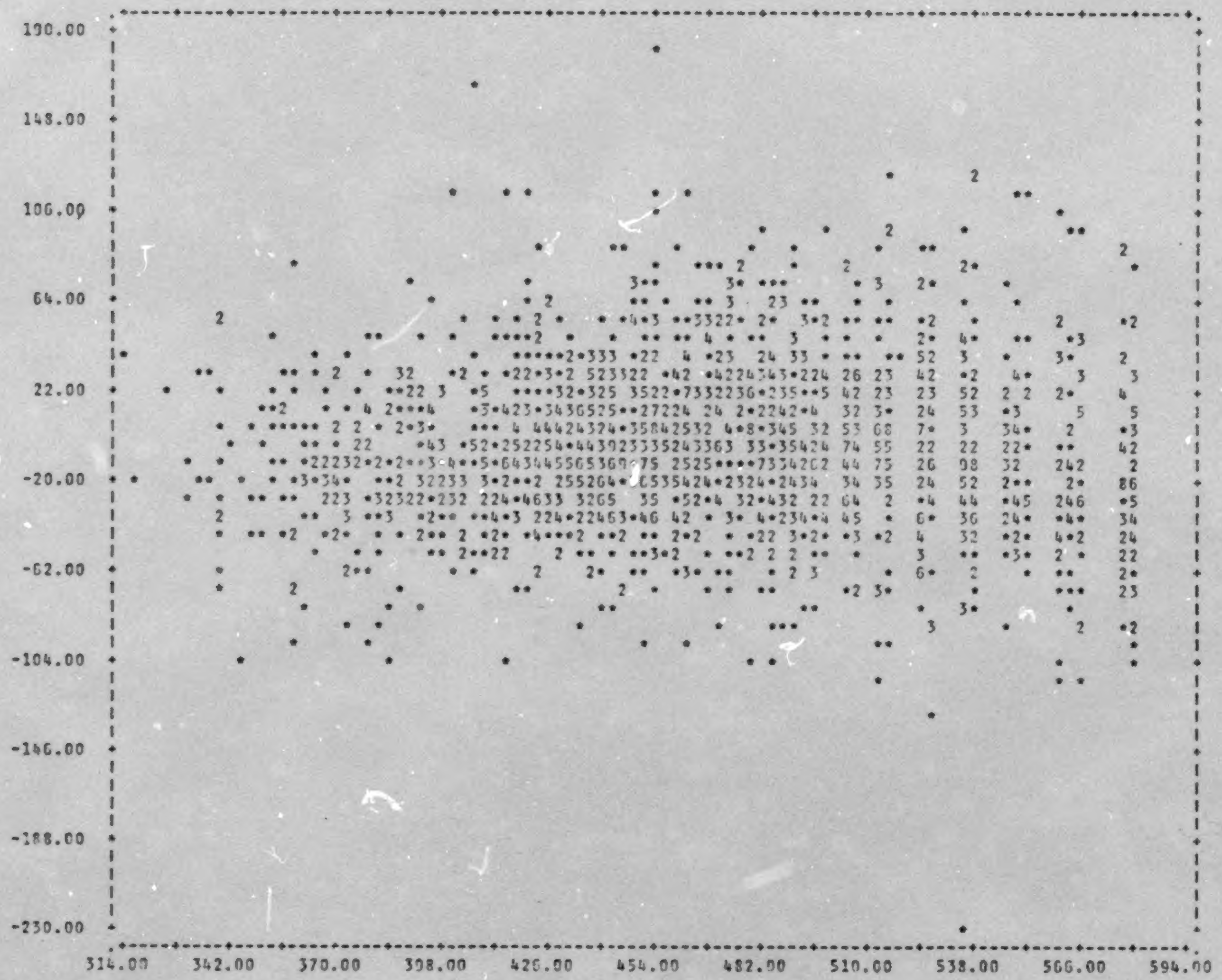

Figure 3. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest ($\hat{Y}$)--Cohort 4, Spring 1972 Reading Total Score Analysis (vertical axis = Y'; horizontal axis = $\hat{Y}$).

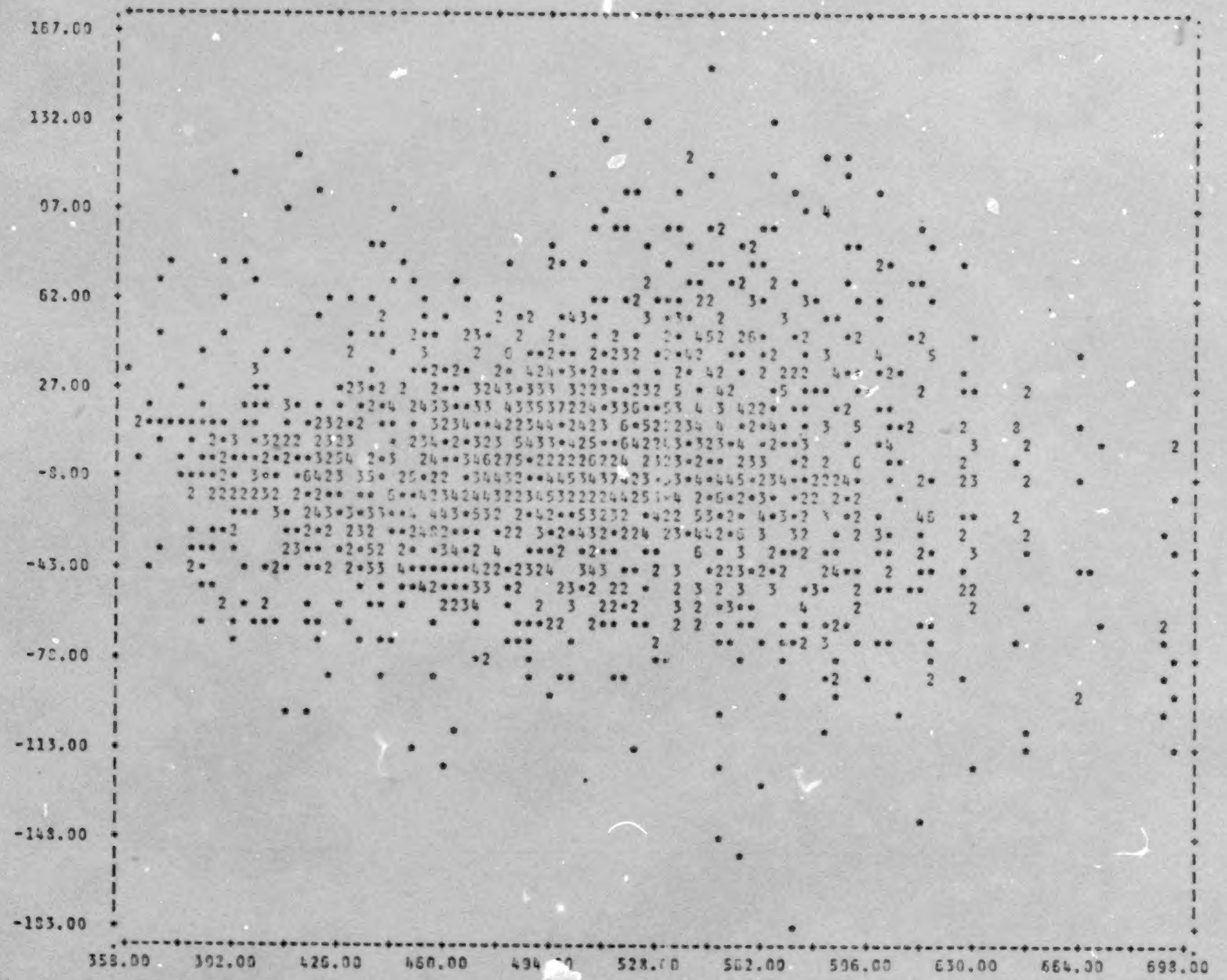

Figure 4. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest (Ŷ)--Cohort 4, Spring 1973 Reading Total Score Analysis (vertical axis = Y'; horizontal axis = Ŷ).

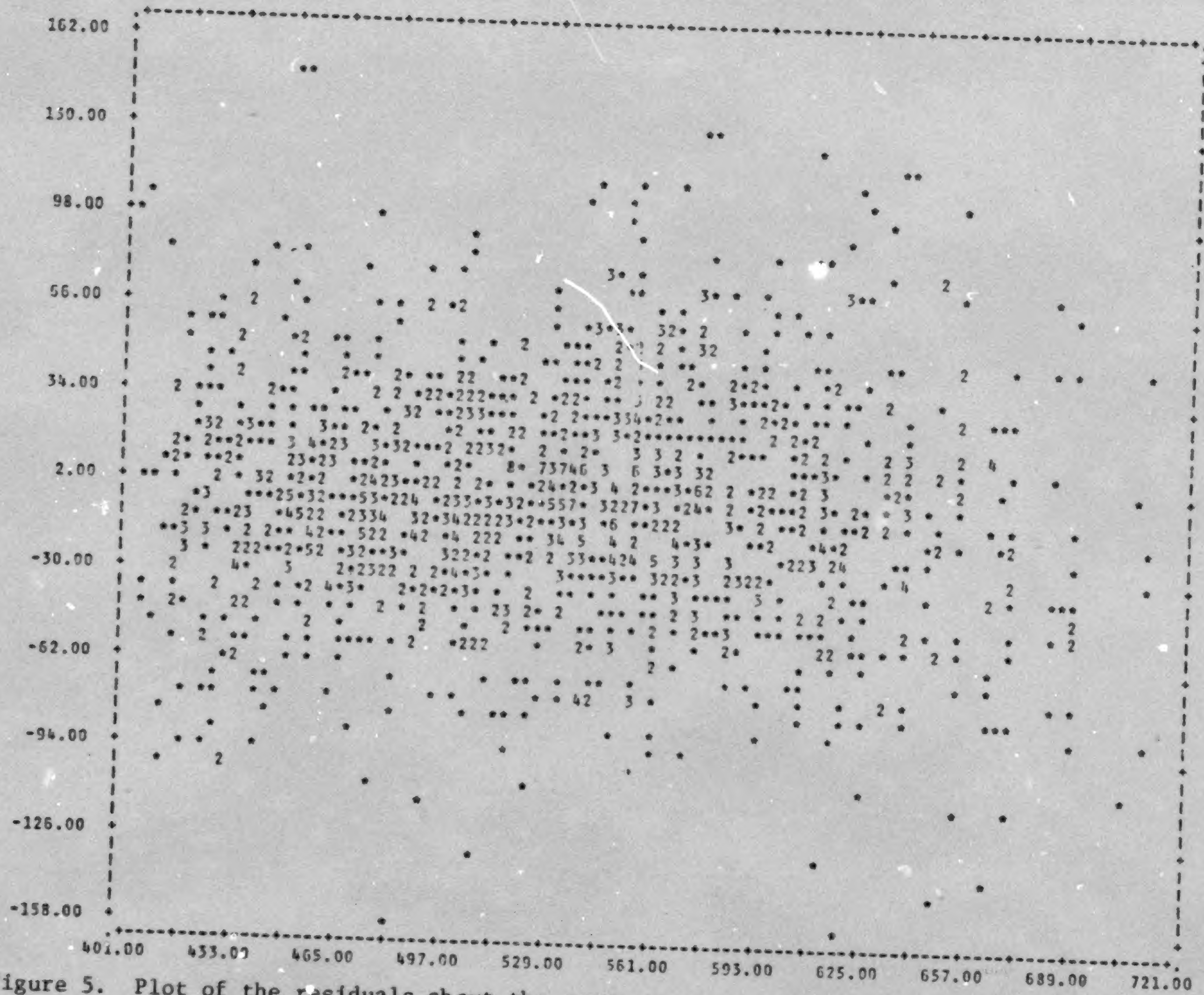

Figure 5. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest ($\hat{Y}$)--Cohort 6, Spring 1972 Reading Total Score Analysis (vertical axis = Y'; horizontal axis = $\hat{Y}$).

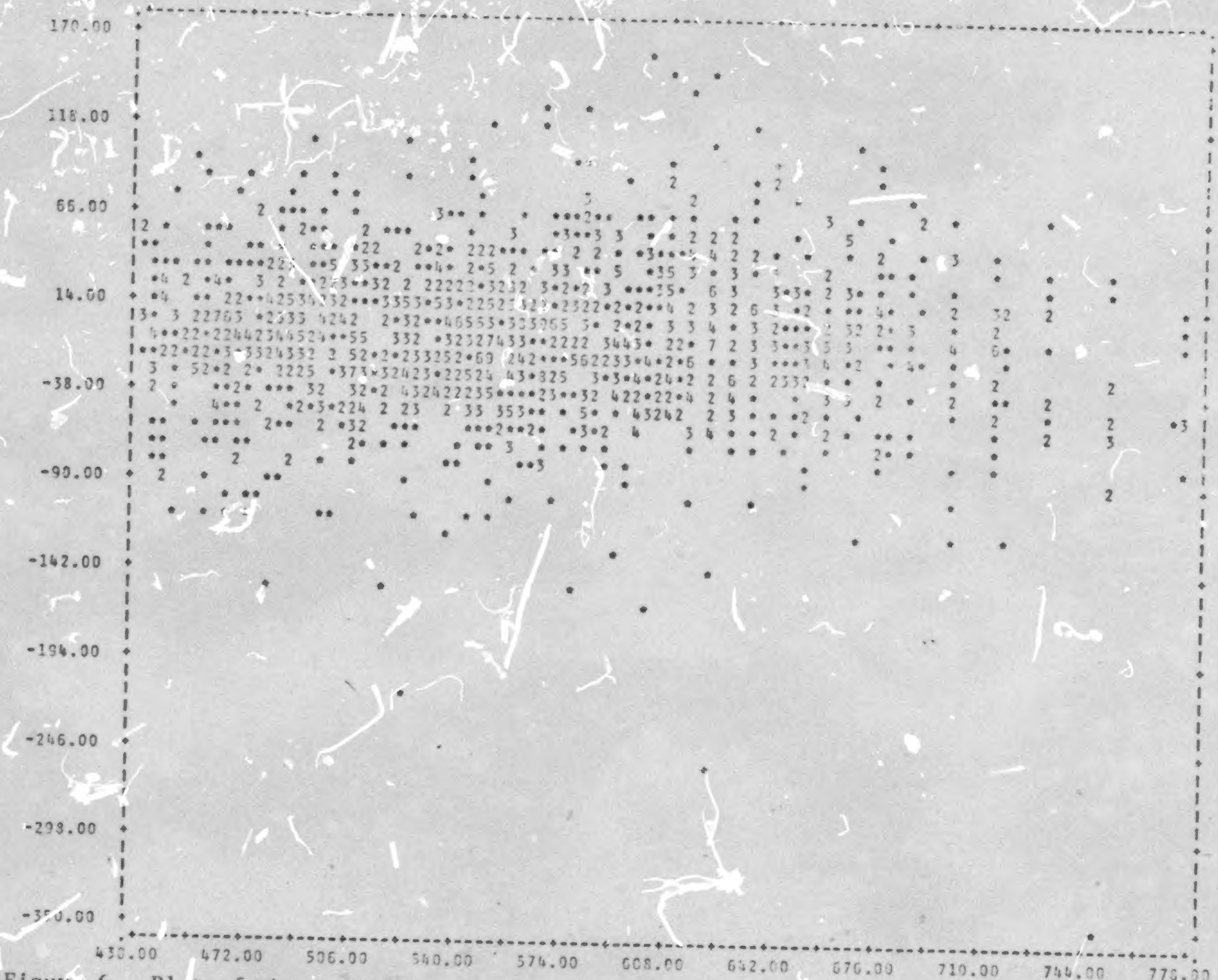

Figure 6. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest ($\hat{Y}$)--Cohort 6, Spring 1973 Reading Total Score Analysis (vertical axis = Y'; horizontal axis = $\hat{Y}$).

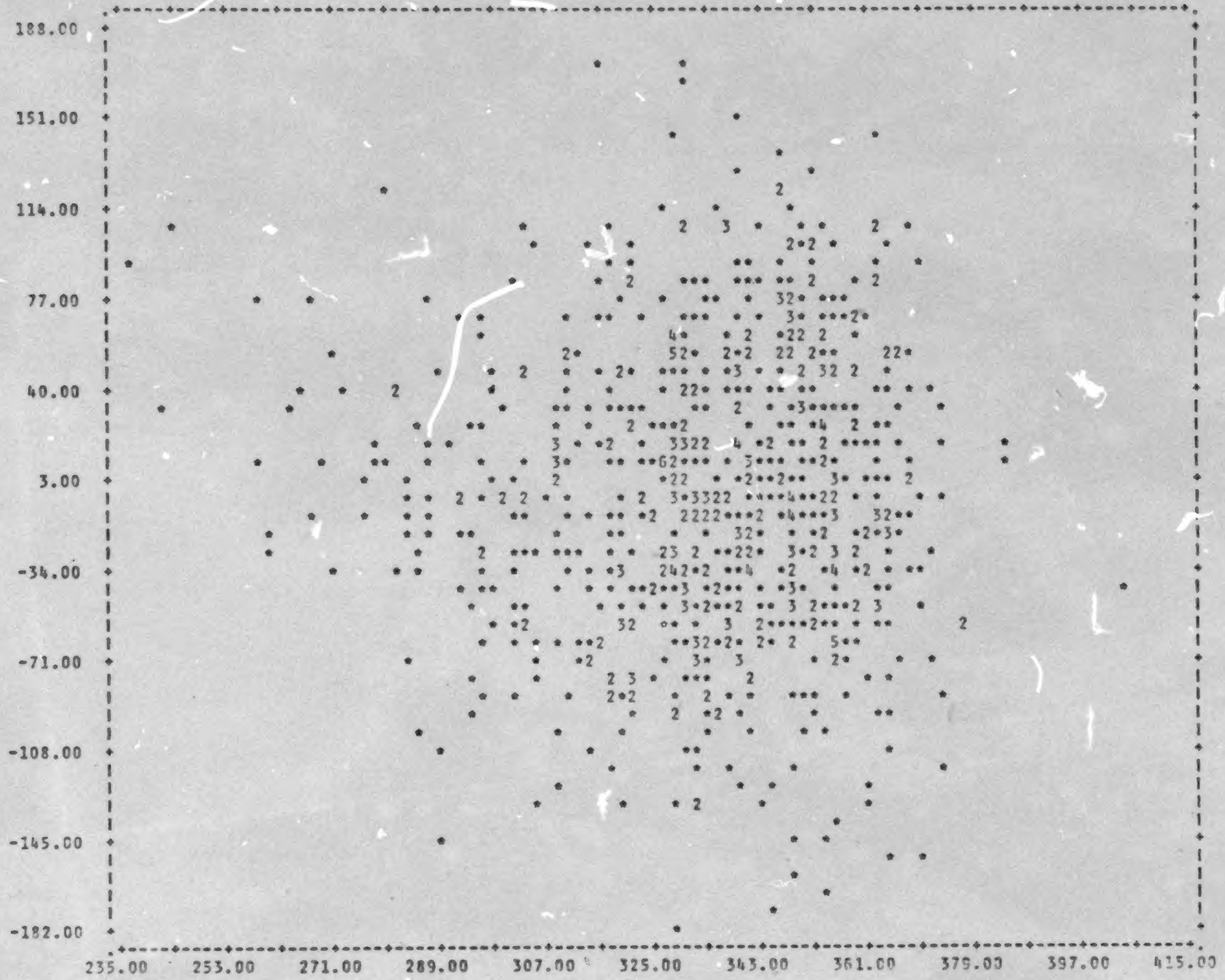

Figure 7. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest ($\hat{Y}$)--Cohort 1, Spring 1972 Language Total Score Analysis (vertical axis = Y'; horizontal axis = $\hat{Y}$).

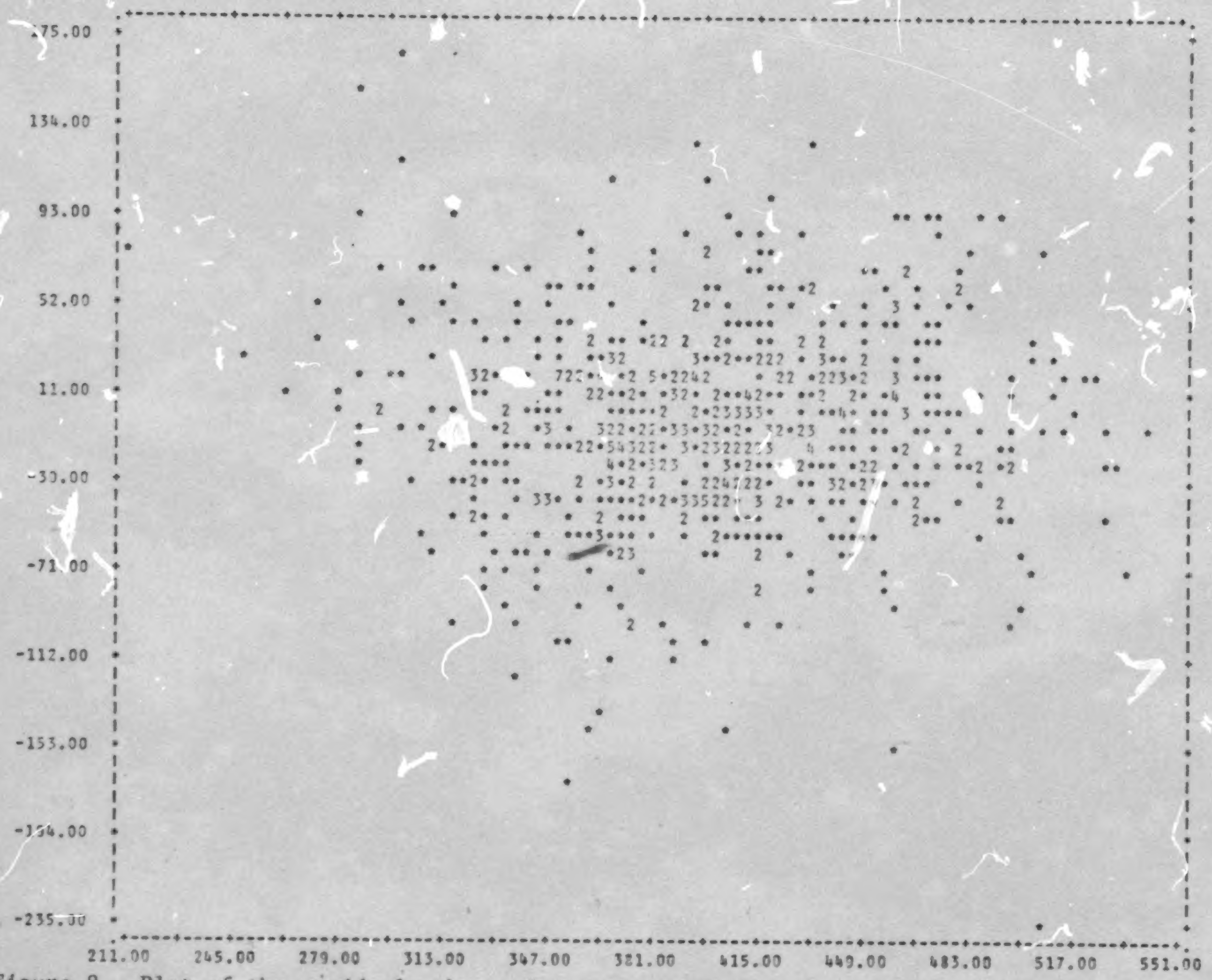

Figure 8. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest ($\hat{Y}$)--Cohort 1, Spring 1973 Language Total Score Analysis (vertical axis = Y'; horizontal axis = $\hat{Y}$).

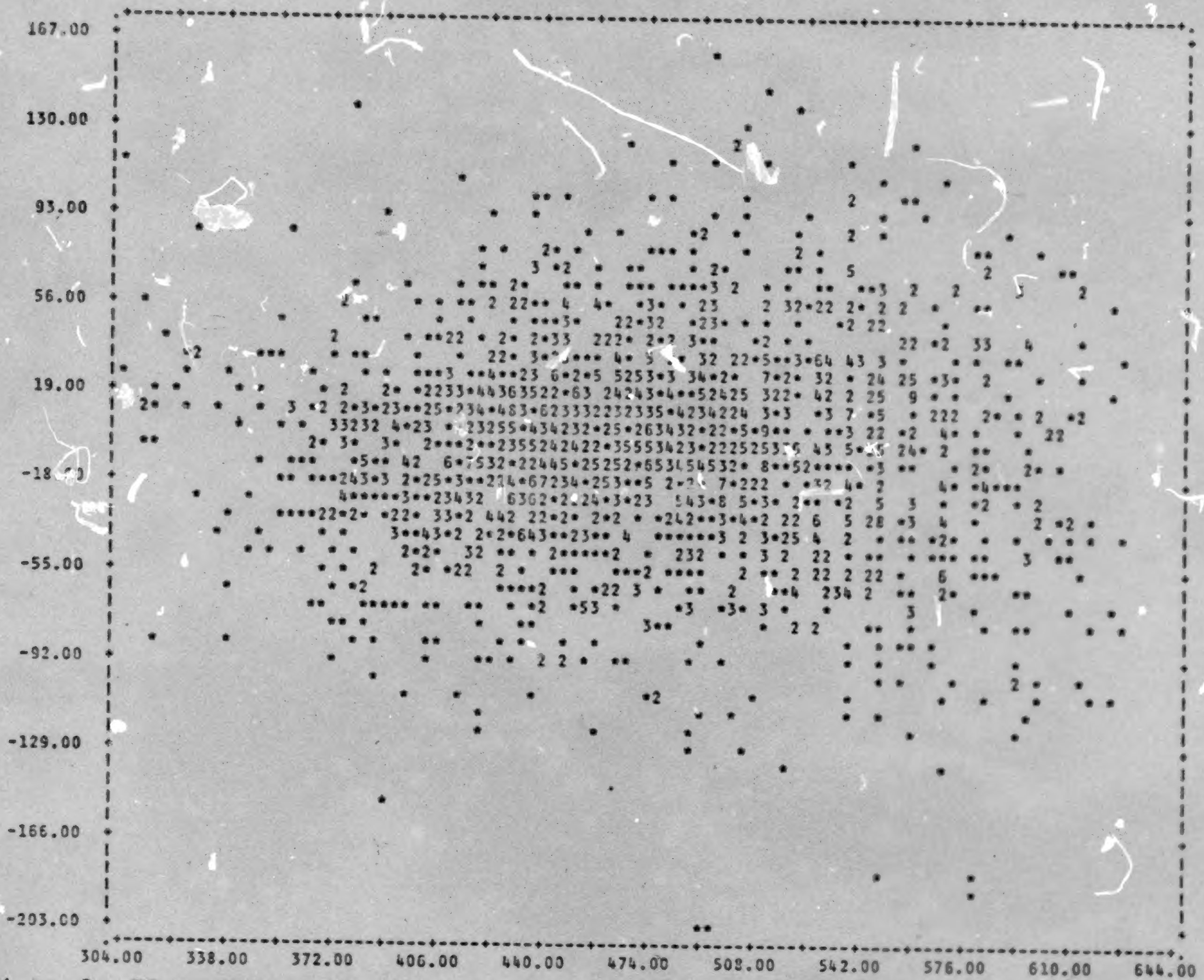

Figure 9. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest ($\hat{Y}$)--Cohort 4, Spring 1972 Language Total Score Analysis (vertical axis = Y'; horizontal axis = $\hat{Y}$).

IV-D-10

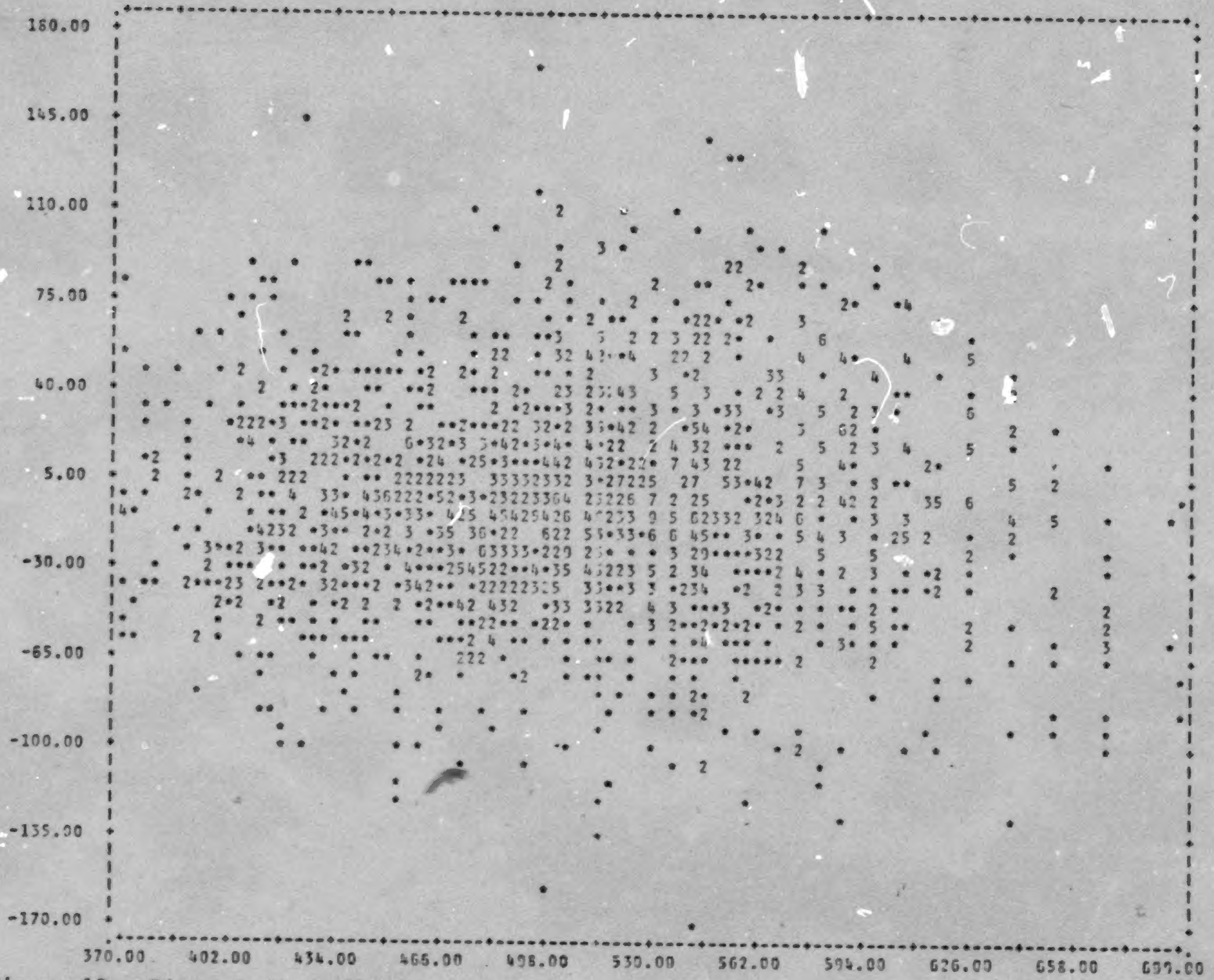

Figure 10. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest (Ŷ)--Cohort 4, Spring 1973 Language Total Score Analysis (vertical axis = Y'; horizontal axis = Ŷ).

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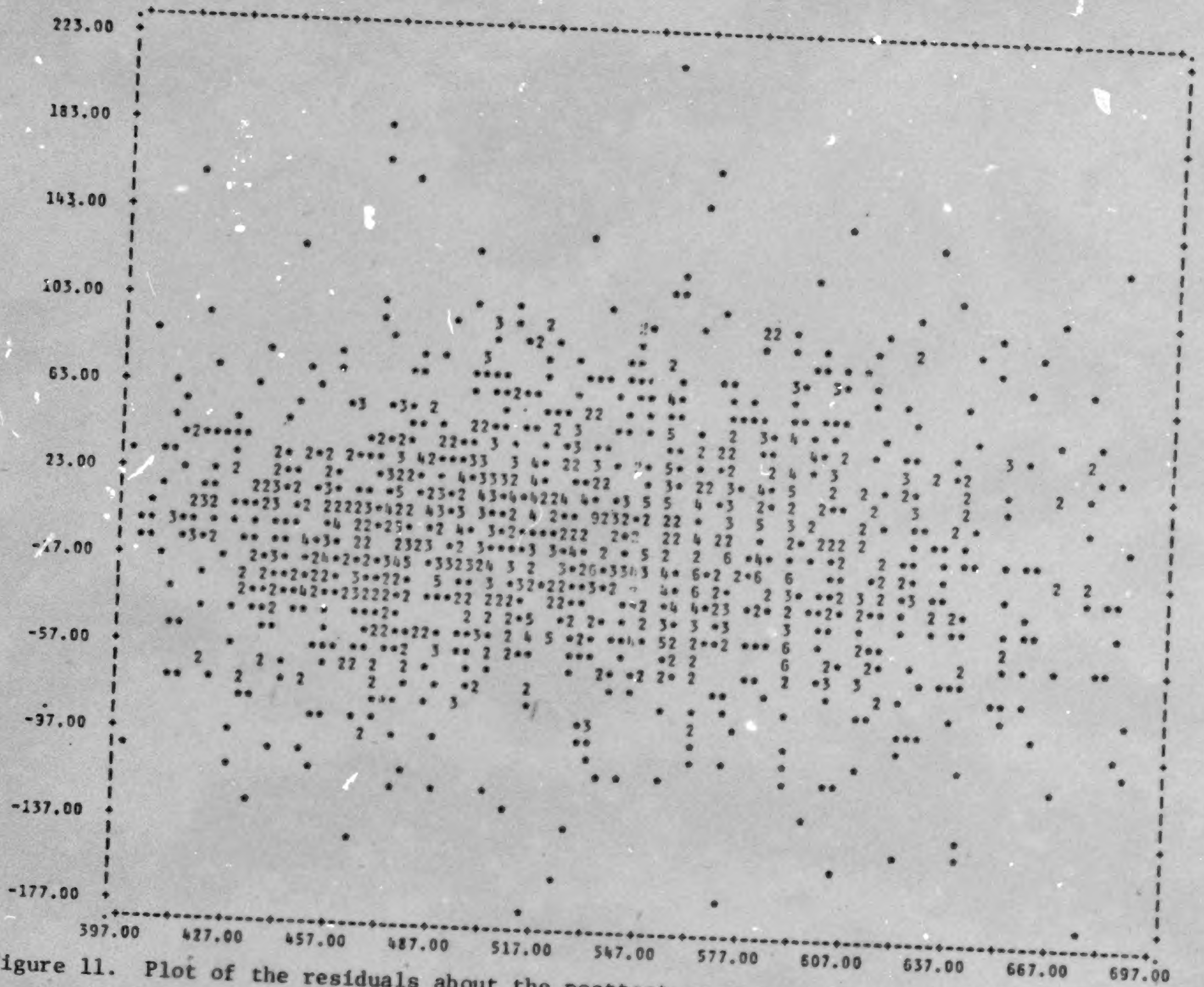


Figure 11. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest ($\hat{Y}$)--Cohort 6, Spring 1972 Language Total Score Analysis (vertical axis = Y'; horizontal axis = $\hat{Y}$).

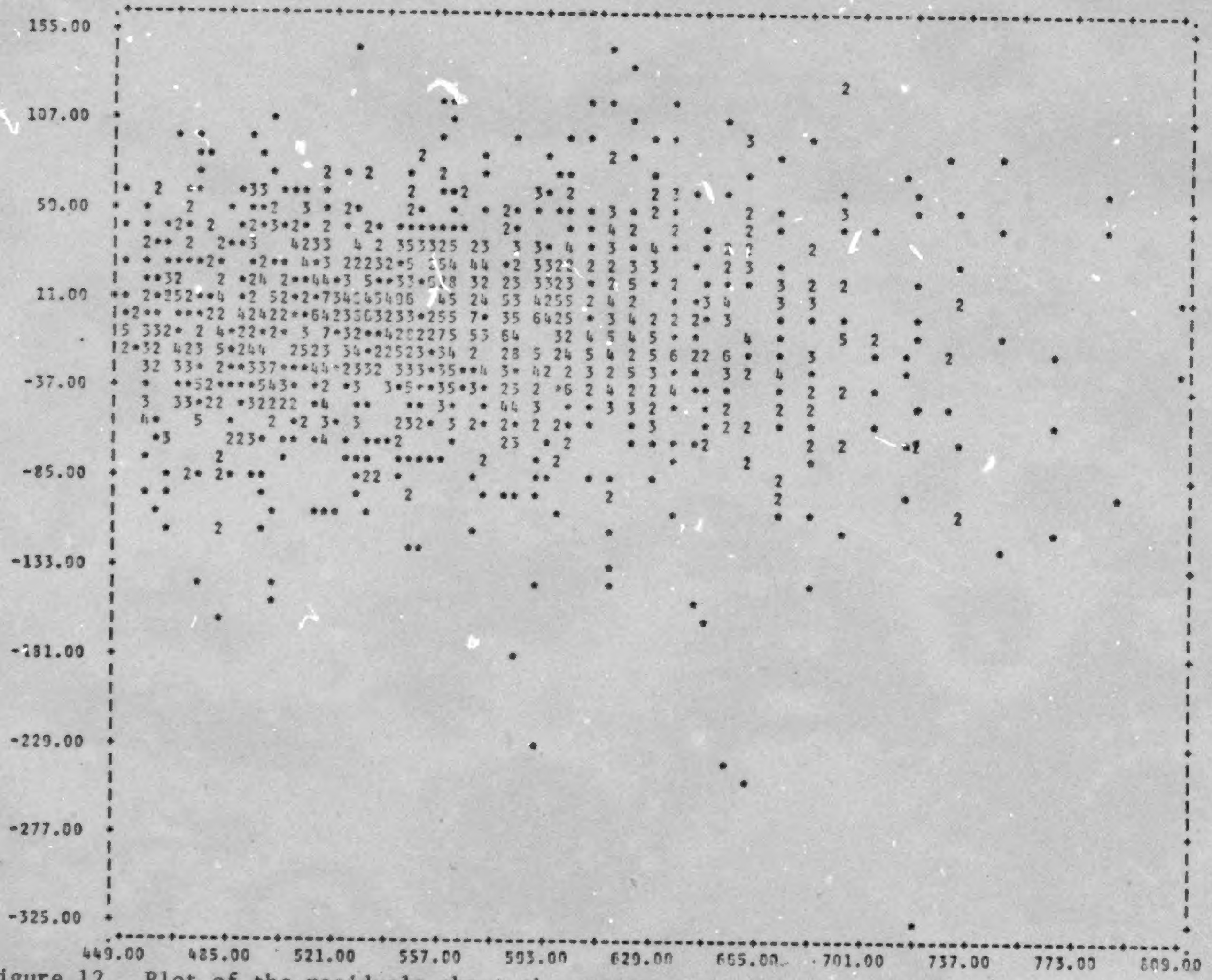


Figure 12. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest ($\hat{Y}$)--Cohort 6, Spring 1973 Language Total Score Analysis (vertical axis = Y'; horizontal axis = $\hat{Y}$).

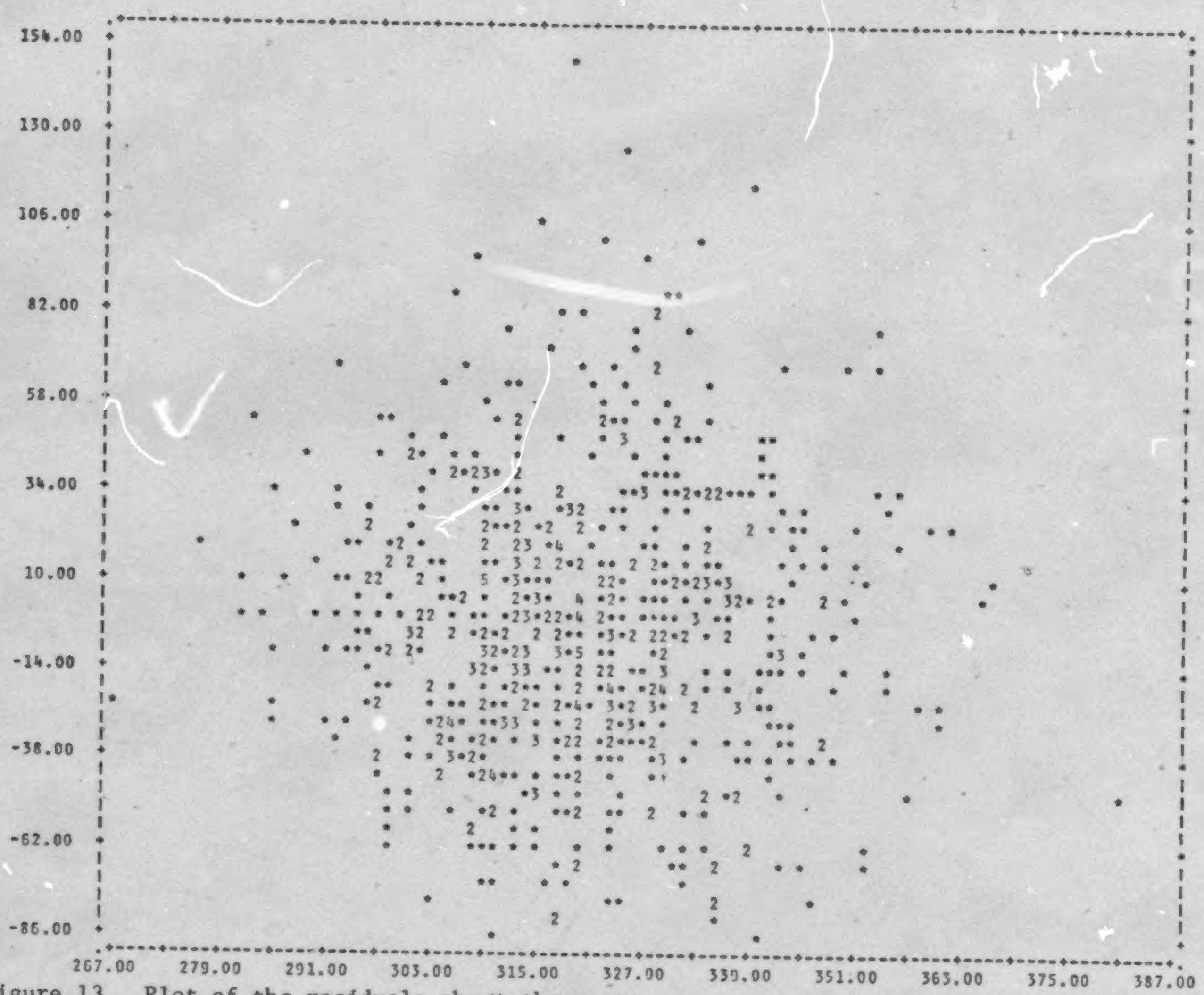


Figure 13. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest (Ŷ)--Cohort 1, Spring 1972 Arithmetic Total Score Analysis (vertical axis = Y'; horizontal axis = Ŷ).

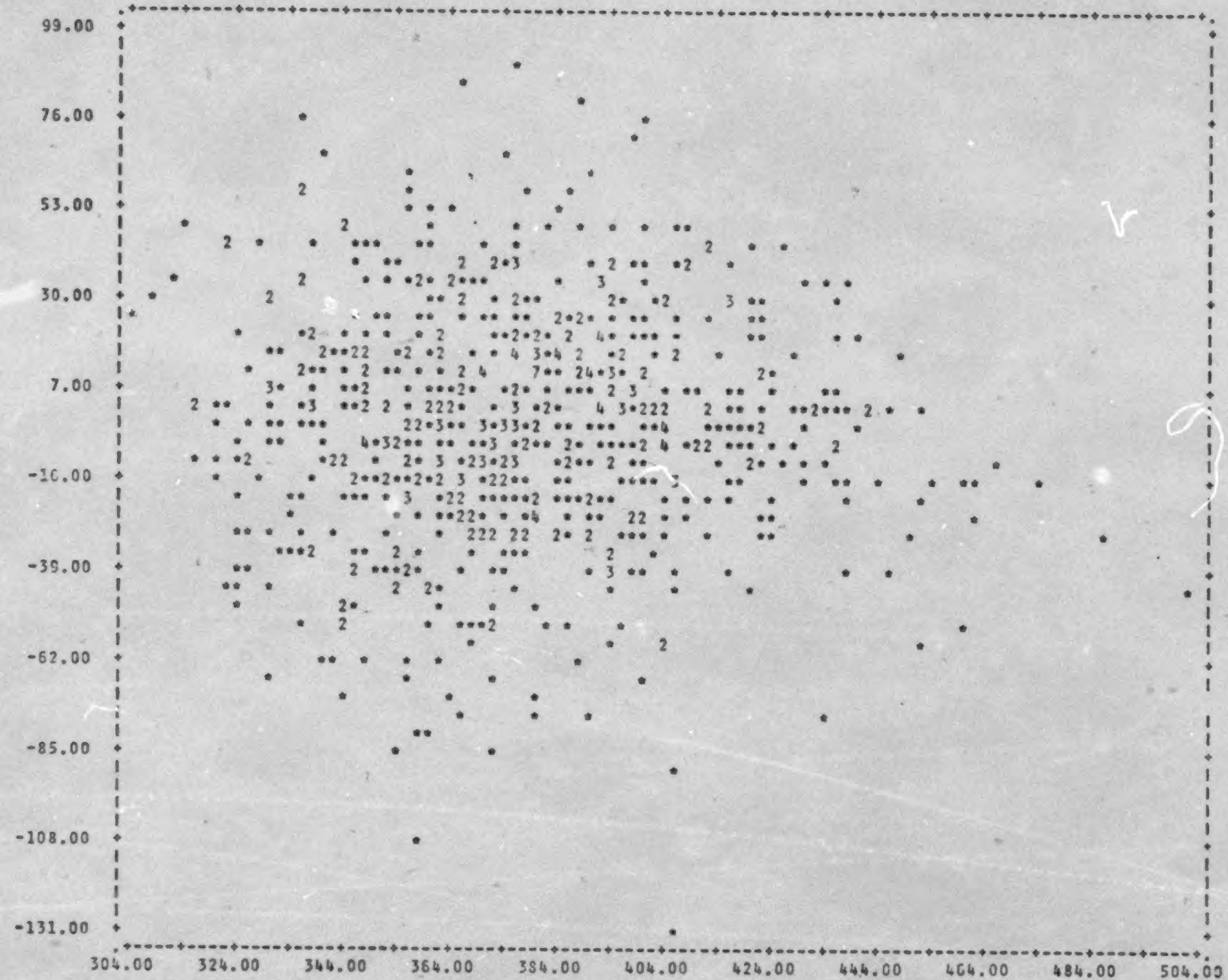


Figure 14. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest ($\hat{Y}$)--Cohort 1, Spring 1973 Arithmetic Total Score Analysis (vertical axis = Y', horizontal axis = $\hat{Y}$).

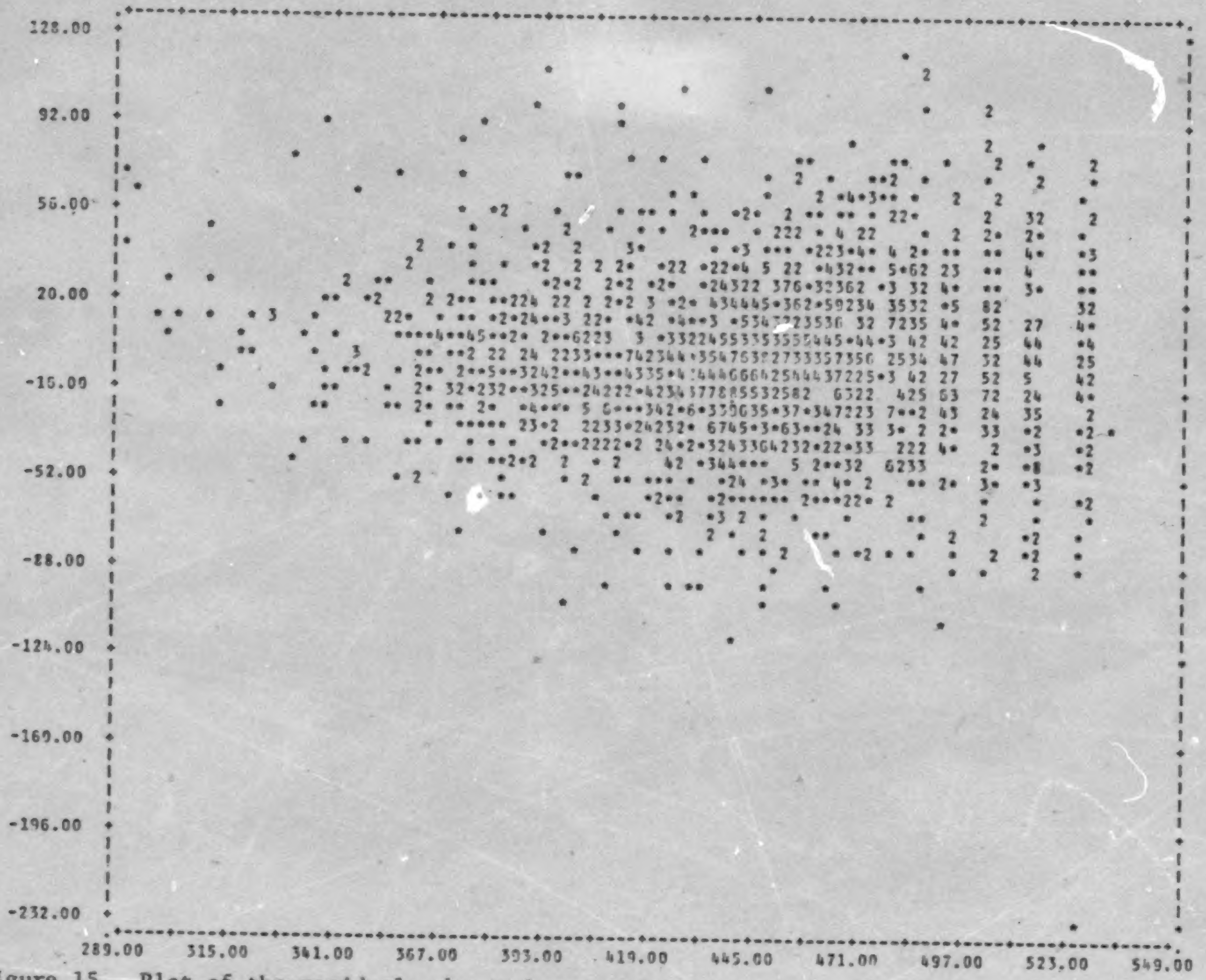


Figure 15. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest ($\hat{Y}$)--Cohort 4, Spring 1972 Arithmetic Total Score Analysis (vertical axis = Y'; horizontal axis = $\hat{Y}$).

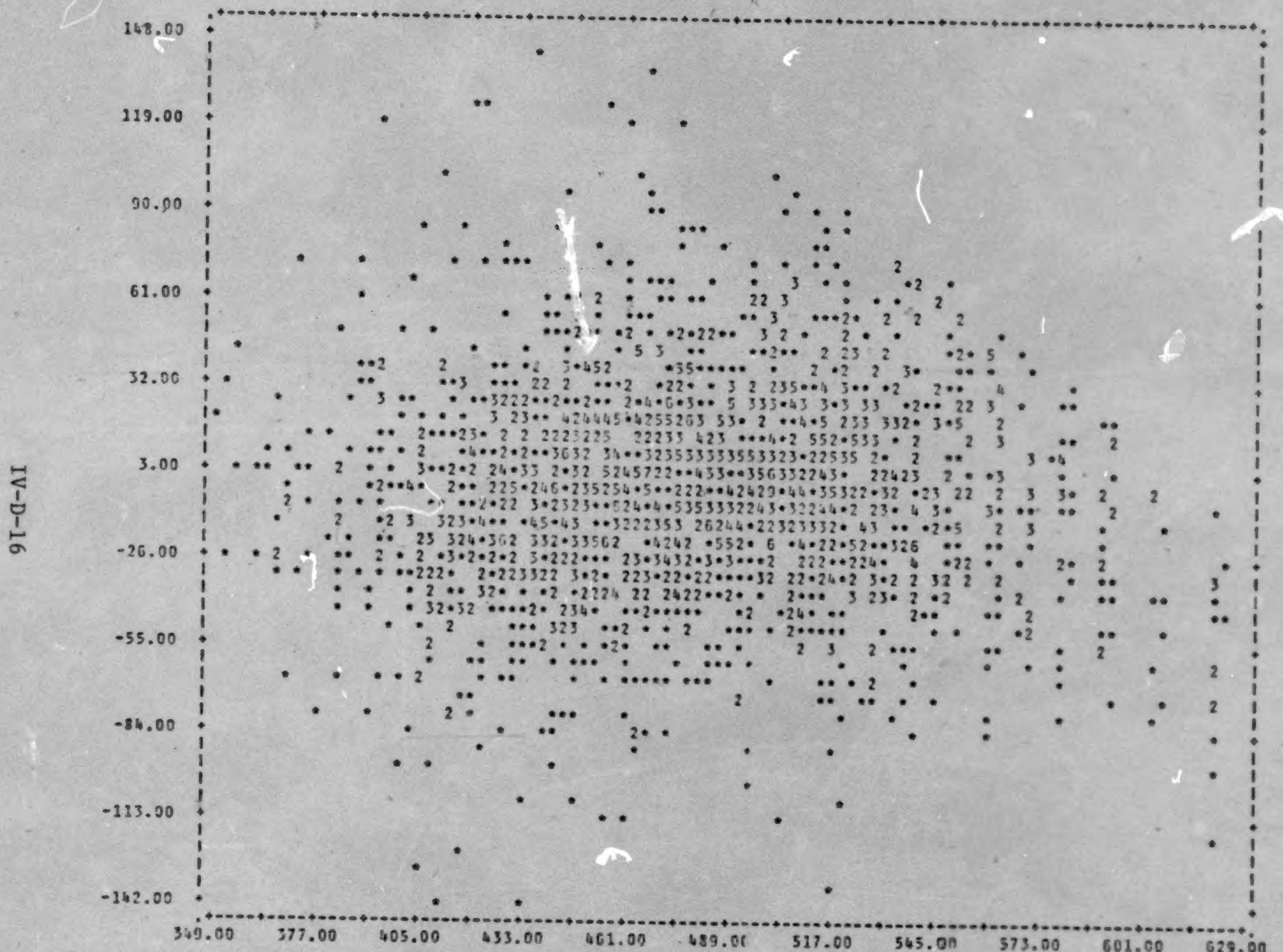


Figure 16. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest (Ŷ)--Cohort 4, Spring 1973 Arithmetic Total Score Analysis (vertical axis = Y'; horizontal axis = Ŷ).

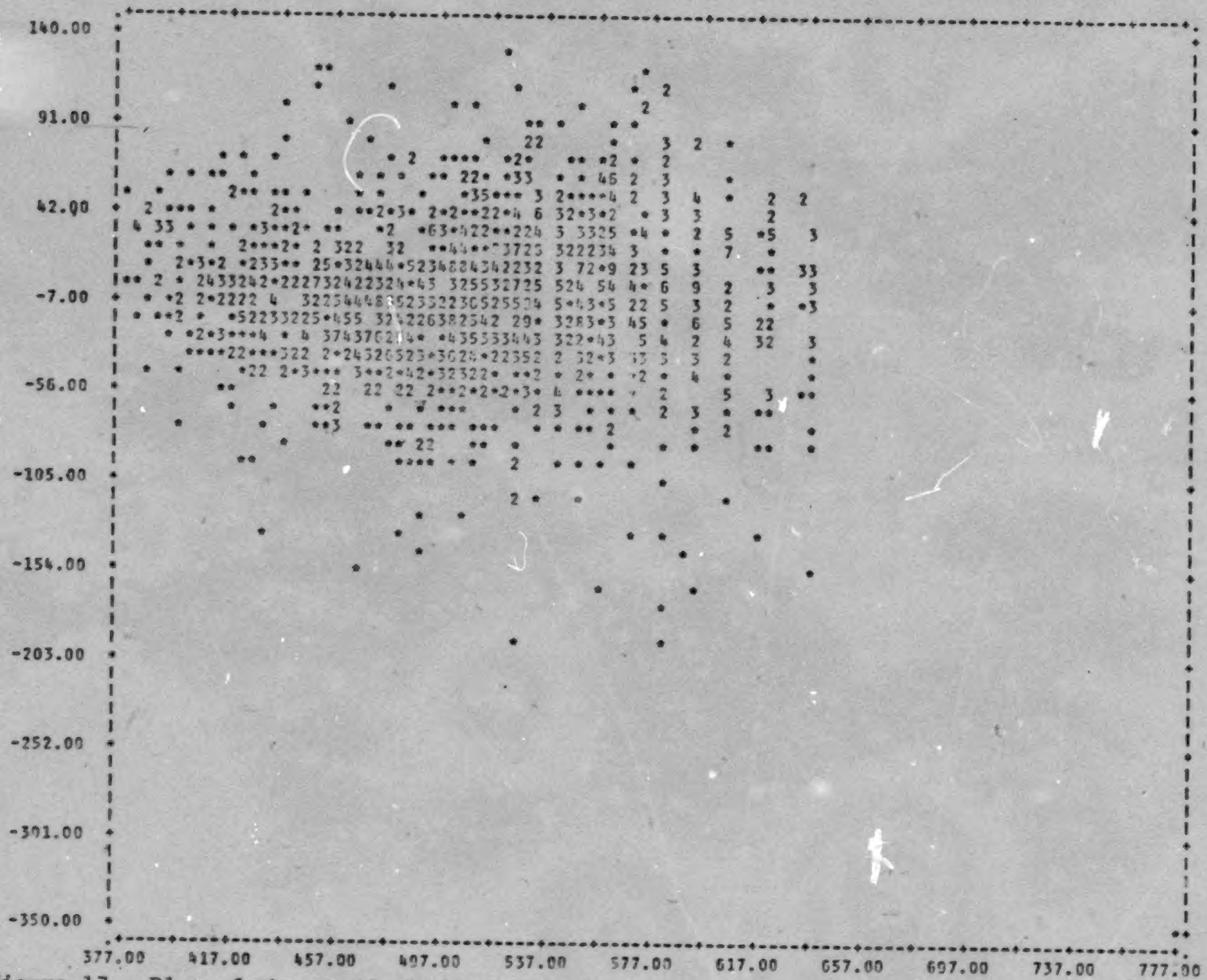


Figure 17. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest ($\hat{Y}$)--Cohort 6, Spring 1972 Arithmetic Total Score Analysis (vertical axis = Y'; horizontal axis = $\hat{Y}$).

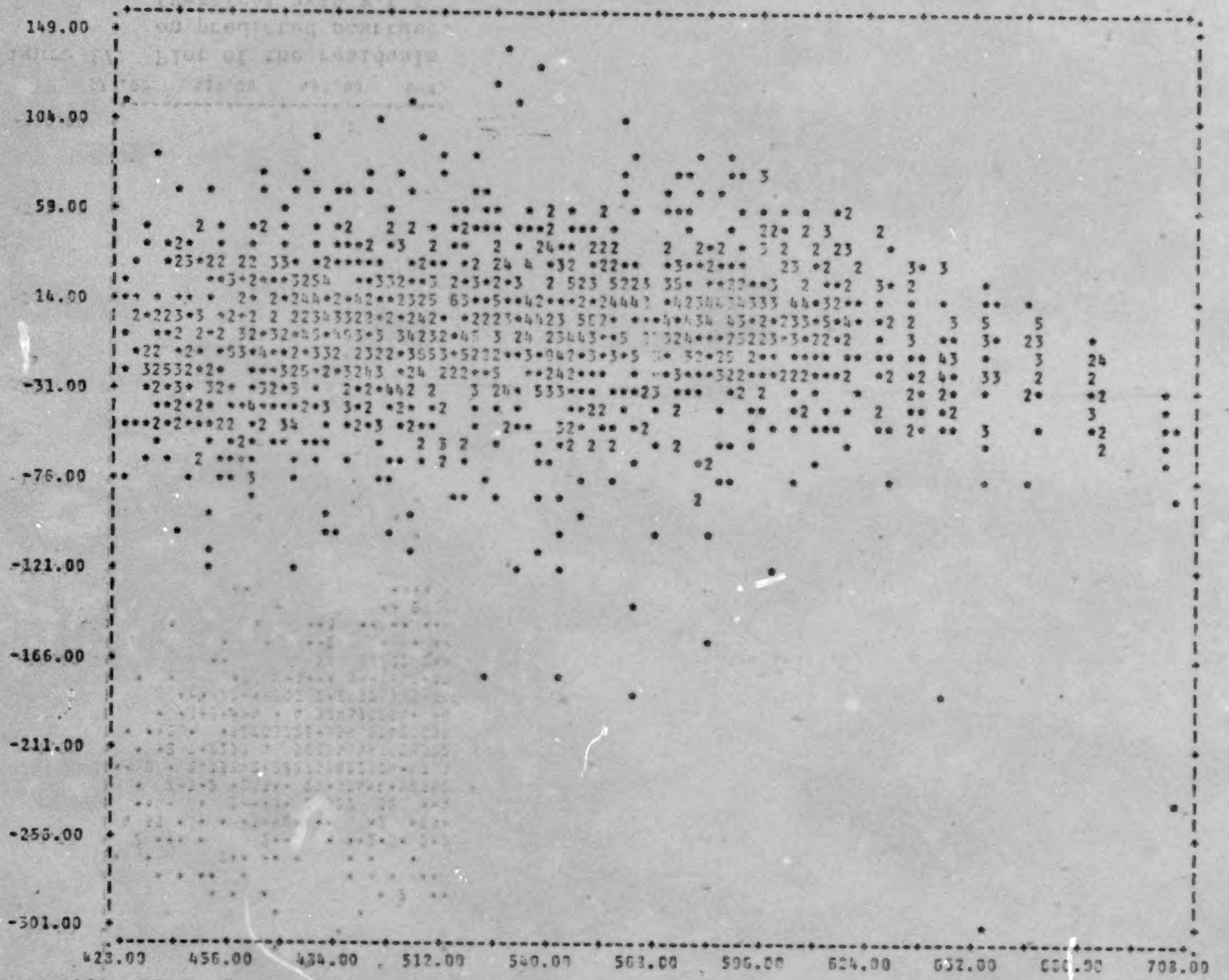


Figure 18. Plot of the residuals about the posttest on pretest regression line (Y') plotted on predicted posttest (Ŷ)--Cohort 6, Spring 1973 Arithmetic Total Score Analysis (vertical axis = Y'; horizontal axis = Ŷ).

APPENDIX IV-E

Guidelines for the Use of Multiple Regression with Multi-Level Predictor Variables

APPENDIX IV-E

Guidelines for the Use of Multiple Regression, Commonality Analysis and Levels Analysis with Multi-Level Predictor Variables

A. Introduction

The utilization of multiple regression analysis and variance partitioning techniques has become increasingly popular in the educational research community during the past decade. This appendix contains a review of two such techniques, commonality analysis and levels analysis, as well as a discussion of how these procedures were used to analyze the multi-level data collected by Project LONGSTEP.

B. Data Base Overview

Project LONGSTEP was designed to be an associational study in which student outcome measures could be related to quantitative descriptions of each student's educational environment, as well as to his/her home background and initial achievement status. Cognitive and attitudinal outcome measures and student background data were obtained from individual students by means of standardized achievement tests and questionnaires. These variables, by definition then, were student-level variables, since they were measured at the individual student level.

In many large-scale studies, all students in a school are assumed to have had exposure to exactly the same treatment and teachers. In fact, the teacher characteristics variables associated with students are usually aggregate measures computed across all teachers in a school. In Project LONGSTEP, however, the teacher and treatment data assigned to a given student involved the attributes of only those teachers and treatments to which that particular student had been exposed. Furthermore, teacher and treatment data were independently attached to individual students because not all students exposed to the same basic educational approach (i.e., treatment) had the same teacher or combination of teachers. A single measure of each teacher attribute was created for each student with more than one teacher in a given subject matter area of instruction (language arts, math, social studies and science) by aggregating these data to the individual student-level. Although more than one student was exposed to a given teacher or combination of teachers (i.e., students were nested under teachers or teacher combinations), the number of these combinations was sufficiently large (across all students in a given analysis data set) that the teacher variables were viewed as student-level variables.

As noted throughout the body of the report, the data collection unit for educational treatment data was a flexibly defined entity called an Educational Experience Analysis Guide group or EdExAG group. Different EdExAG groups were identified within a school when an AIR site visitor could differentiate among the treatments received by different groups of students at a school by means of items found on this guide. Defined in this manner, these groups could include as few students as those within one teacher's class for one subject matter area of instruction or as many students as those in all grades within a school for all subject matter areas (i.e., language arts, math, social studies and science). EdExAG groups, then, were created in response to treatment variations that existed within a school and within a grade and may be viewed as an efficient but group-level approximation to the quantification of each individual student's educational treatment.

It is important to note that EdExAG groups were not created specifically in response to variation with respect to the scales developed from the items on the EdExAG's. As just noted, different EdExAG groups were identified within a school when an AIR site visitor could differentiate among the treatments received by different groups of students at that school by means of items on the EdExAG. Thus, two groups of students could belong to two different EdExAG groups because (a) two different schools were involved and EdExAG groups did not cut across schools, or (b) two groups within the same school could be differentiated on the basis of one or more EdExAG items. Since different combinations of items could lead to the same scale score on a multi-item scale, it was possible that two EdExAG groups were identified within a school because of two discrepant items, but that the two groups had exactly the same scale score on the scale of which the items were members. In summary, EdExAG groups did not have to be different with respect to EdExAG scales because the variables used to define groups (i.e., the EdExAG items) made finer distinctions than did scales.

Figure E-1 contains an example of the multi-level nature of the Project LONGSTEP data, assuming two sites, five schools, one quantitative EdExAG variable with three levels, and seven EdExAG groups. The nesting of EdExAG groups under levels of the EdExAG scale that is illustrated in Figure E-1 reflects the LONGSTEP approach to treatment documenation -- that is, different treatment groups are not necessarily different with respect to all of the basic components underlying educational programs.

<table>
<tr><td colspan="4">Site 1</td><td colspan="3">Site 2</td></tr>
<tr><td>School A</td><td colspan="2">School B</td><td>School C</td><td>School D</td><td colspan="2">School E</td></tr>
<tr><td colspan="3">EdExAG Scale Score = 3.0</td><td colspan="2">EdExAG Scale Score = 2.0</td><td colspan="2">EdExAG Scale Score = 1.3</td></tr>
<tr><td>EdExAG Group I</td><td>EdExAG Group II</td><td>EdExAG Group III</td><td>EdExAG Group IV</td><td>EdExAG Group V</td><td>EdExAG Group VI</td><td>EdExAG Group VII</td></tr>
</table>

Figure E-1. Example of the nesting of the Project LONGSTEP data.

Because of the particular pattern of nesting present in the LONGSTEP data, differences attributable to EdExAG group differences alone would actually involve three components -- difference among sites, differences among schools within sites and differences among EdExAG groups within schools (see Figure E-1). Since the treatment data were to be the primary foci of the analysis conducted by the project, however, the analytic models did not involve the examination of site-level or school-level differences. Rather, posttest variation that could be attributed to the quantitative EdExAG scales or to differences among EdExAG groups were studied.

There were, therefore, two different levels to the data analyzed by Project LONGSTEP -- (1) the student-level variables such as the test scores, attitudinal and background measures, and teacher attributes attached to individual students and (2) the EdExAG-level data such as the EdExAG scales themselves or the dummy codes which noted EdExAG group membership.

C. Commonality Analysis

In the usual multiple regression approach, the investigator is likely to assume that some degree of proportionality exists between a variable's independent contribution to the prediction of the criterion and its causal influence and then proceeds to make inferences regarding the processes being studied. Such an approach may be useful when predictor variables are uncorrelated with one another, because each variable's unique contribution then expresses the only linear relationship it has with the criterion. However, when predictors are intercorrelated, each variable that is correlated with another predictor will have associations with the criterion that it shares with the variables with which it is correlated. Furthermore, these joint relationships cannot be interpreted directly because it is not possible to determine: (1) the extent to which the shared influence of the variables should be apportioned to the individual variables in that combination; or (2) the extent to which the shared influence represents cooperative influences of the variables in that combination.

The student-level outcome measures collected by Project LONGSTEP are known to be complex measures whose variance can be related to a number of sources. Some of these sources are beyond the influence of the school, for example, student socioeconomic background or SES. Other sources, such as the educational treatments to which students are subjected, however, are amenable to control by school officials. The purpose of Project LONGSTEP has been to assess the effects that such controllable variables as educational treatment characteristics have on school outcomes over-and-above the effects of uncontrollable influences. Because of the nonexperimental nature of the study design it was expected that many of these correlates of posttest performance would be intercorrelated with each other and that an assessment of the influence of a given variable would require examining the effects that variable shared with other variables in the model. The commonality analysis approach, involving the computation and examination of all the components of predictable criterion variance, appeared to offer a level of analytic detail that would facilitate insights concerning the intertwined influences of the background, treatment, and criterion variables being studied.

Commonality analysis is a technique that yields a series of coefficients which express the extent to which each independent variable (or each set of independent variables) in a multiple regression equation (a) is a unique, non-overlapping predictor of the criterion and (b) is a confounded predictor of the criterion due to its correlations with other independent variables in the model. Essentially,

> "... the squared multiple correlation is broken up into elements assigned to each individual regressor and to each possible combination of regressors. The elements have the property that the appropriate sums not only add to squared multiple correlations with all regressors, but also to the squared multiple correlation of any subset of variables, including the simple correlations ... . Commonality analysis does not tell us anything that cannot be deduced from a table of squared multiple correlations. However, commonality analysis does help us make comparisons in an organized manner." (Beaton, 1973, p. 2)

Commonality analysis has been described, as well as extensively used, by Mayeske and his colleagues (1972, 1973a, 1973b) in their reanalyses of the Equal Educational Opportunity Survey data (Coleman et al., 1966). Other authors (Beaton, 1973; Kerlinger and Pedhazur, 1973; Mood, 1971; and Tatsuoka, 1973) have also discussed this method. The basic model underlying the procedure assumes that prediction of a criterion variable can be attributed to a "unique" contribution of each of the predictor variables and to the "common" contribution of all combinations of independent variables. If, for example, there are three sets of predictor variables--SES(S), Pretest(P) and a series of k dummy variables (D_i) encoding membership in k EdExAG groups--and if we let a uniqueness be symbolized by U and a commonality by C, the total multiple correlation (squared) with posttest [$R^2(S,P,D_i)$] would be,

$$R^2(S,P,D_i) = U(S) + U(P) + U(D_i) + \cdots \quad \text{(E-1)}$$
$$+ C(S,P) + C(S,D_i) + C(P,D_i) + \cdots$$
$$+ C(S,P,D_i) .$$

These $2^\ell - 1$ additive components express the (a) unique predictive effects of each of ℓ regressor variables (or sets of variables) in the system; and (b) the joint and inseparable influence of each of the possible combinations of the ℓ regressor variables. The uniquenesses are computed first. The dependent variable is regressed on the ℓ independent variables and then on all possible combinations of the $\ell - 1$ predictors. Given the three predictor-sets of SES(S), Pretest(P) and the dummy variables (D_i), these squared multiple correlations would be,

$$R^2(S,P, D_i);$$
$$R^2(S,P);$$
$$R^2(S,D_i); \text{ and}$$
$$R^2(P,D_i).$$

The uniqueness for each variable (set) is then computed by subtracting from the R^2 for all three predictor sets $[R^2(S,P,D_i)]$, the R^2 of the regression model from which that particular variable (set) has been dropped. For example, the uniqueness for the dummy codes $[U(D_i)]$ would be equal to

$$R^2(S,P,D_i) - R^2(S,P).$$

U(S) and U(P) would be computed in similar fashion. Thus,

$$U(S) = R^2(S,P,D_i) - R^2(P,D_i); \text{ and}$$
$$U(P) = R^2(S,P,D_i) - R^2(S,D_i).$$

The second-order commonality coefficients, symbolized as C(S,P), $C(S,D_i)$ and $C(P,D_i)$, are obtained by subtraction. Since the commonality model implies that the correlation (squared) between the criterion and the k dummy variables, D_i, is

$$R^2(D_i) = U(D_i) + C(S,D_i) + C(P,D_i) + \cdots + C(S,P,D_i); \tag{E-2}$$

subtracting $R^2(D_i)$, $U(S)$ and $U(P)$ from $R^2(S,P,D_i)$, leaves the second-order commonality $C(S,P)$:

$$\begin{aligned} &R^2(S,P,D_i) - R^2(D_i) - U(S) - U(P) = \\ &[U(S) + U(P) + U(D_i) + C(S,P) + C(S,D_i) + \ldots \\ &\quad + C(P,D_i) + C(S,P,D_i)] - [U(D_i) + \ldots \\ &\quad + C(S,D_i) + C(P,D_i) + \ldots \\ &\quad + C(S,P,D_i)] - [U(S)] - [U(P)] = C(S,P) \end{aligned} \tag{E-3}$$

The other second-order commonality coefficients, $C(S,D_i)$ and $C(P,D_i)$, are computed similarly. The third-order commonality coefficent $[C(S,P,D_i)]$ is equal to $R^2(S,P,D_i)$ minus all the lower order commonalities and the uniquenesses.

Approximately the same methodology is used to compute the coefficients for problems involving other numbers of predictors. Mood (1969) and Kerlinger and Pedhazur (1973) have presented general formulas so that a commonality analysis can be performed with any number of predictor variables or variable sets.

It should be noted that only a uniqueness may be viewed as reflecting a proportion of criterion variance. This is because a uniqueness is a multiple part correlation squared; that is, it is the square of an independent variable (set) with the criterion, after that independent variable (set) has been residualized on the basis of all of the other independent variables in the model. Second-order coefficients, such as $C(S,P)$, and third-order coefficients like $C(S,P,D_i)$, on the other hand, are not proportions of criterion variance but are relative measures of the amount of predictive overlap of the variables or variable sets involved. Negative higher-order commonalities are possible and indicate that the explanatory power of one variable (set) is greater when the other variable (set) is also in the model--a sort of suppressor effect.

D. Levels Analysis

One of the most general and potentially useful analytic techniques which can be utilized with any multi-level data base is a variance partitioning technique sometimes called "levels" analysis. In brief, this procedure involves regressing a student-level criterion variable on a set of dummy variables, D_i, which encode membership in k mutually exclusive groups, such as EdExAG groups. The square of the multiple correlation obtained, $R^2(D_i)$, indicates the proportion of variance in the criterion variable which can be attributed to group differences. Stated somewhat differently, $R^2(D_i)$ will indicate the proportion of variation in a student-level criterion variable which can be predicted from knowledge of group membership. Furthermore, the $R^2(D_i)$ will reflect the maximum proportion of student-level criterion variance which can be explained by any and all quantitative predictor variables defined at the group level. To understand this, one must first appreciate how a multiple R^2 is obtained when a student-level variable is regressed on a series of binary-coded variables encoding mutually exclusive group membership.

Let us examine what happens in a two-group situation described by the linear model,

$$Y_j = b_1X_{1_j} + b_2X_{2_j} + e_j , \qquad \text{(E-4)}$$

where

Y_j = criterion variable score for student j;

X_{1_j} = 1; if student j is a member of group 1; 0, if from group 2;

X_{2_j} = 1, if student j is a member of group 2; 0, if from group 1;

b_1 and b_2 = least squares raw score regression coefficients;

e_j = an error component for student j.

Table 1 shows the Y, X_1, and X_2 scores for three students in each of two groups.

TABLE 1

Example of Levels Analysis Data Matrix

Y	X_1	X_2	e	e^2
2	1	0	0	0
3	1	0	1	1
1	1	0	-1	1
5	0	1	0	0
6	0	1	1	1
4	0	1	-1	1

The solution for the multiple correlation, R, of Y with X_1 and X_2 will involve the selection of raw score regression weights for the variables X_1 and X_2 such that the squared difference (i.e., the square of the prediction error, e^2) between the actual criterion score (Y_j) and that predicted on the basis of those weights is a minimum when summed over all entities (see e_j^2 in Table 1). Now, if Y'_j is the predicted value of Y_j, and

$$Y'_j = b_1 X_{1_j} + b_2 X_{2_j} , \qquad \text{(E-5)}$$

what values of b_1 and b_2 will minimize the sum of the squared errors in prediction if, from equations E-4 and E-5,

$$e_i^2 = (Y_j - Y'_j)^2 \ ? \qquad \text{(E-6)}$$

First, by substituting equation E-5 into equation E-6, we have

$$e_j^2 = [Y_j - (b_1 X_{1_j} + b_2 X_{2_j})]^2 \ ; \qquad \text{(E-7)}$$

and,

$$\sum_{j=1}^{6} e_j^2 = \sum_{j=1}^{6} [Y_j - (b_1 X_{1_j} + b_2 X_{2_j})]^2 . \qquad \text{(E-8)}$$

Next, let us enter the data in Table 1 above into equation E-7. For these six students, equation E-7 becomes,

$$e_1^2 = [2 - (b_1 1 + b_2 0)]^2 \qquad \text{(E-9)}$$

$$e_2^2 = [3 - (b_1 1 + b_2 0)]^2 \qquad \text{(E-10)}$$

$$e_3^2 = [1 - (b_1 1 + b_2 0)]^2 \qquad \text{[illegible]-11)}$$

$$e_4^2 = [5 - (b_1 0 + b_2 1)]^2 \qquad \text{(E-12)}$$

$$e_5^2 = [6 - (b_1 0 + b_2 1)]^2 \qquad \text{(E-13)}$$

$$e_6^2 = [4 - (b_1 0 + b_2 1)]^2 . \qquad \text{(E-14)}$$

Note, however, that for student 1, equation E-9 reduces to

$$e_1^2 = (2 - b_1)^2 \ . \qquad \text{(E-15)}$$

In fact, the same pattern holds true for all students in group one (i.e., for whom X_1 equals 1).

For student 4, equation E-12,

$$e_4^2 = [5 - (b_1 0 + b_2 1)]^2 ,$$

becomes

$$e_4^2 = (5 - b_2)^2 . \qquad \text{(E-16)}$$

Likewise, the same pattern holds true for all students in group two.

Examination of equations E-15 and E-16 indicates that minimizing the overall prediction error (see equation E-8) actually involves minimizing two sums,

$$\sum_{j=1}^{3} (Y_j - b_1)^2 \quad \text{and} \quad \sum_{j=4}^{6} (Y_j - b_2)^2 .$$

Since the groups are mutually exclusive, minimization of the prediction error for the two groups separately will minimize the prediction error for the two-group system. Because, by definition, the mean is that point about which the sum of the squared deviations is a minimum, b_1 must equal the mean of the criterion variable for all students in group 1 and b_2 must equal the mean computed over all students in group 2.

The implication is that when one uses binary coded variables to encode group membership, the raw score regression weights yielded by regressing the criterion on such predictors turn out to be the mean criterion score for the students in each of the respective groups. The mean of the dependent variable in each group is of course a group-level variable; that is, it is a single value which can be associated with each student in a given group and has no intra-group variation.

The proportion of criterion variance that can be attributed to all mean differences among groups with respect to the criterion, $R^2(D_i)$, is also known as eta square $[\eta^2(D_i)]$ and, in effect, involves fitting a regression line through each of the group means. The presence of k groups means that this regression line may have a linear component and k - 2 nonlinear components in order for it to pass through each of the group means. Therefore, since it minimizes the amount of prediction error for each group separately and involves a group-level variable (i.e., the group means on the criterion) whose linear and nonlinear relationship to the criterion is a maximum, a levels analysis

(1) quantifies the amount of among-group and within-group variance present in the criterion variable and thereby

(2) sets an upper limit on the proportion of criterion variance that can be attributed or related to any and all group-level predictor variable or variables.

E. Regression and Commonality Analysis with Multi-Level Predictor Variables

In order to understand the use of regression analysis with multi-level predictor variables, it is first necessary to examine the within-group and among-group components present in zero-order correlations. If two student-level variables, X and Y, are measures obtained on students who are members of one of k groups, it is possible to partition the deviation of each score from its grand mean into a within-group and among-group portion. Thus,

$$X_{ij} - \bar{\bar{X}} = (X_{ij} - \bar{X}_i) + (\bar{X}_i - \bar{\bar{X}}), \text{ and} \tag{E-17}$$

$$Y_{ij} - \bar{\bar{Y}} = (Y_{ij} - \bar{Y}_i) + (\bar{Y}_i - \bar{\bar{Y}}), \tag{E-18}$$

where,

X_{ij} and Y_{ij} = raw scores on two student-level variables, X and Y, obtained by student j in group i;

$\bar{\bar{X}}$ and $\bar{\bar{Y}}$ = the grand mean of variables X and Y computed over all students; and

$\bar{X}_i$ and $\bar{Y}_i$ = the mean of variables X and Y for the students in group i.

The formula for the Pearson r between variables X and Y is

$$r_{xy} = \frac{\sum_{i=1}^{k} \sum_{j=1}^{n_i} (X_{ij} - \bar{\bar{X}})(Y_{ij} - \bar{\bar{Y}})}{N \sqrt{\frac{\sum_{i=1}^{k} \sum_{j=1}^{n_i} (X_{ij} - \bar{\bar{X}})^2}{N}} \sqrt{\frac{\sum_{i=1}^{k} \sum_{j=1}^{n_i} (Y_{ij} - \bar{\bar{Y}})^2}{N}}} \tag{E-19}$$

where,

r_{xy} = the correlation between student-level variables X and Y;

k = the number of groups;

n_i = the number of students in group i;

$N = \sum_{i=1}^{k} n_i$, the total number of students in all k groups.

It is then possible to substitute equations E-17 and E-18 into equation E-19 with the result,

(E-20)

$$r_{xy} = \frac{\sum_{i=1}^{k} \sum_{j=1}^{n_i} (X_{ij} - \bar{X}_i)(Y_{ij} - \bar{Y}_i) + \sum_{i=1}^{k} n_i (\bar{X}_i - \bar{\bar{X}})(\bar{Y}_i - \bar{\bar{Y}})}{\sum_{i=1}^{k} n_i \sqrt{\dfrac{\sum_{i=1}^{k} \sum_{j=1}^{n_i} (X_{ij} - \bar{X}_i)^2}{\sum_{i=1}^{k} n_i} + \dfrac{\sum_{i=1}^{k} n_i (\bar{X}_i - \bar{\bar{X}})^2}{\sum_{i=1}^{k} n_i}} \sqrt{\dfrac{\sum_{i=1}^{k} \sum_{j=1}^{n_i} (Y_{ij} - \bar{Y}_i)^2}{\sum_{i=1}^{k} n_i} + \dfrac{\sum_{i=1}^{k} n_i (\bar{Y}_i - \bar{\bar{Y}})^2}{\sum_{i=1}^{k} n_i}}}$$

Note: Crossproducts of within-group deviations with among-group deviations have not been included in Equation E-20 since they all sum to zero; that is,

$$\sum_{i=1}^{k} \sum_{j=1}^{n_i} (X_{ij} - \bar{X}_i)(\bar{Y}_i - \bar{\bar{Y}}) = \sum_{i=1}^{k} \sum_{j=1}^{n_i} (Y_{ij} - \bar{Y}_i)(\bar{X}_i - \bar{\bar{X}}) = \ldots$$

$$= \sum_{i=1}^{k} \sum_{j=1}^{n_i} (X_{ij} - \bar{X}_i)(\bar{X}_i - \bar{\bar{X}}) = \sum_{i=1}^{k} \sum_{j=1}^{n_i} (Y_{ij} - \bar{Y}_i)(\bar{Y}_i - \bar{\bar{Y}}) = \ldots$$

$$= 0 .$$

It is much less complex, however, to discuss the within-group and among-group components in equation E-20 in terms of covariances and variances. Thus, equation E-20 can be rewritten as

$$r_{xy} = \frac{\text{Cov}_{xy}(W) + \text{Cov}_{xy}(A)}{\sqrt{\text{Var}_x(W) + \text{Var}_x(A)}\sqrt{\text{Var}_y(W) + \text{Var}_y(A)}} \qquad \text{(E-21)}$$

where,

$\text{Cov}_{xy}(W)$ = the mean within-group crossproduct of deviations from the group means for variables X and Y;

$\text{Cov}_{xy}(A)$ = the mean among-group crossproduct of deviations from the grand mean for variables X and Y;

$\text{Var}_x(W)$ and $\text{Var}_y(W)$ = the within-group variance for variables X and Y; and

$\text{Var}_x(A)$ and $\text{Var}_y(A)$ = the among-group variance for variables X and Y.

Thus, the correlation between two student-level variables, like posttest and SES or pretest and SES, is, in fact, composed of within-groups and among-groups covariances and variances. Consider for example, the levels analysis case where a student-level dependent variable Y_{ij} is correlated with the mean of that variable computed at the EdExAG group level. In this case, one substitutes $\bar{Y}_i$ for X_{ij} and $\bar{\bar{Y}}$ for $\bar{\bar{X}}$ in equation E-20. However, the within-groups components will drop out because $\bar{Y}_i$, by definition, has no within-group variation, that is,

$$\frac{\sum_{i=1}^{k} \sum_{j=1}^{n_i} (\bar{Y}_i - \bar{Y}_i)(Y_i - \bar{Y}_i)}{\sum_{i=1}^{k} n_i} = \text{Cov}_{yy}(W) = 0.0; \text{ and} \qquad \text{(E-22)}$$

$$\frac{\sum_{i=1}^{k} \sum_{j=1}^{n_i} (\bar{Y}_i - \bar{Y}_i)^2}{\sum_{i=1}^{k} n_i} = \mathrm{Var}_y(W) = 0.0 \quad . \tag{E-23}$$

Equation E-21, for the case where a student-level variable Y is correlated with the group mean on Y, thus becomes,

$$r_{y\bar{y}_i} = \frac{\mathrm{Cov}_{yy}(A)}{\sqrt{\mathrm{Var}_y(A)}\sqrt{\mathrm{Var}_y(T)}} \tag{E-24}$$

where,

$r_{y\bar{y}_i}$ = the correlation between a student-level variable, Y, and the group means ($\bar{Y}_i$) for that variable and

$\mathrm{Var}_y(T)$ = the total variance of variable Y, or, [$\mathrm{Var}_y(W) + \mathrm{Var}_y(A)$].

However, when a variable is correlated with its group-level mean value, its among-groups covariance, $\mathrm{Cov}_{yy}(A)$ is equal to its among-group variance, $\mathrm{Var}_y(A)$. Equation E-24 then reduces to,

$$r_{y\bar{y}_i} = \frac{\mathrm{Var}_y(A)}{\sqrt{\mathrm{Var}_y(A)}\sqrt{\mathrm{Var}_y(T)}} \text{ ; and} \tag{E-25}$$

$$r^2_{y\bar{y}_i} = \frac{\mathrm{Var}_y(A) \cdot \mathrm{Var}_y(A)}{\mathrm{Var}_y(A) \cdot \mathrm{Var}_y(T)} = \frac{\mathrm{Var}_y(A)}{\mathrm{Var}_y(T)} \quad . \tag{E-26}$$

These derivations in conjunction with the levels analysis derivations again show that the square of the correlation of a student-level variable with a series of dummy variables encoding EdExAG group membership is

$$r^2_{y\bar{y}_i} = R^2(D_i) = \frac{\mathrm{Var}_y(A)}{\mathrm{Var}_y(T)} , \qquad \text{(E-27)}$$

the ratio of among-group variation to the total.

The implication of these results for using a series of dummy codes as predictors of a student-level criterion variable along with one or more student-level predictor variable(s) is that these other variables can account only for within-group variation in Y -- because all variation in Y that exists among groups can be related to, or is completely confounded with, the dummy variables, D_i. Since $\mathrm{Var}_y(T) = \mathrm{Var}_y(W) + \mathrm{Var}_y(A)$, the proportion of variance which can be related to any and all student-level predictors (above that attributable to group differences) is

$$1 - R^2(D_i) = 1 - r^2_{y\bar{y}_i} = \frac{\mathrm{Var}_y(W)}{\mathrm{Var}_y(T)} . \qquad \text{(E-28)}$$

This same logic, of course, can be applied to all of the correlations among any student-level variable and a series of multi-level predictor variables. For example, the multiple correlations squared of SES(S) with the k dummy variables $[R^2_s(D_i)]$ would be nothing more than a levels analysis of SES and would be based upon among-group variation in SES:

$$R^2_s(D_i) = r^2_{s\bar{s}_i} = \frac{\mathrm{Var}_s(A)}{\mathrm{Var}_s(T)} . \qquad \text{(E-29)}$$

It is also true that $R^2_s(D_i)$ or $r^2_{s\bar{s}_i}$ quantifies the maximum proportion of variation in SES that is occurring among groups.

Since it can be shown that all among-groups variance components of all student-level predictor variables are wholly confounded with the k dummy variables, only within-groups components of the student-level predictors will remain to be related to each other and to the dependent variable if the student-level predictors are residualized on the basis of the k dummy variables. Let us examine the composition of such a part correlation which, when squared, is, of course, the same as a commonality analysis uniqueness (U) or first-order commonality coefficient.

Let Y be the dependent variable, posttest; S be a student-level variable, SES; and D_i, a series of k dummy variables encoding EdExAG group membership. The correlation (squared) of posttest with that part of SES which is independent of or uncorrelated with EdExAG group membership is

$$r^2_{y(s\cdot d_i)} = r^2_{ys'} \ , \qquad \text{(E-30)}$$

where

s' = the deviation of s_{ij}, the SES score for student j in group i, from the SES mean for all students in group i.

If s'_{ij} is substituted into equation E-20 for X_{ij}, the among-groups components of the posttest/SES correlation will drop out since $\bar{s}'_i = \bar{\bar{s}}' = 0.0$; that is, the mean deviation score for each group and the overall mean of the deviation scores are both equal to zero. Similarly the among-groups component of the variance of the SES residual would drop out. Since all of the covariance of variable s' with y would be within-groups covariance [i.e., $\mathrm{Cov}_{ys}(W) = \mathrm{Cov}_{ys'}(T)$, since $\mathrm{Cov}_{ys'}(A) = 0$], and since all of the variance of s' would be within-group variance, equation E-21 would become,

$$r_{y(s\cdot d_i)} = r_{ys'} = \frac{\mathrm{Cov}_{ys}(W)}{\sqrt{\mathrm{Var}_s(W)}\ \sqrt{\mathrm{Var}_y(T)}} \ . \qquad \text{(E-31)}$$

From equation E-28 it follows that

$$\mathrm{Var}_s(W) = [\mathrm{Var}_s(T)] \cdot [1 - R^2_s(D_i)] \qquad \text{(E-32)}$$

so,

$$r_{ys'} = r_{y(s\cdot d_i)} = \frac{\mathrm{Cov}_{ys}(W)}{\sqrt{[\mathrm{Var}_s(T)][1 - R^2_s(D_i)]}\ \sqrt{\mathrm{Var}_y(T)}} \ . \qquad \text{(E-33)}$$

Equation E-33, for the part correlations may also be written as,

$$r_{ys'} = r_{y(s\cdot d_i)} = \frac{\dfrac{\mathrm{Cov}_{ys}(W)}{\sqrt{\mathrm{Var}_s(T)}\ \sqrt{\mathrm{Var}_y(T)}}}{\sqrt{1 - R^2_s(D_i)}} \ . \qquad \text{(E-34)}$$

These derivations suggest that

(a) all among-groups components of student-level predictor variables are completely confounded with a series of dummy variables encoding group membership;

(b) the uniquenesses or first-order commonalities for the student-level variables in a commonality analysis of a multi-level predictor model reflect proportions of criterion variance attributable to within-group covariation with the criterion;

(c) higher-order commonality coefficients indexing overlap among student-level variables reflect within-group confounding because all group-level variation is confounded with the dummy variables;

(d) the first-order commonality for the dummy variable set would indicate the proportion of criterion variance among groups that is not confounded with any group differences with respect to the student-level variables; and

(e) the higher-order commonality coefficients involving the dummy variables index a group-level component present in the student-level variable(s) that is confounded with group differences, since correlations with the set of dummy codes are functions of mean differences or among-group variation only.

One important implication of these conclusions needs to be mentioned at this point. When a large number of mutually exclusive groups are involved, some investigators have computed the criterion mean for each group and then used this new variable as a single group-level predictor instead of an unmanageably large number of dummy variables. If one is only attempting to partition the total variance in the criterion into among-group and within-group components, the square of the correlation between the criterion and the group criterion means will provide this result. However, a multi-level prediction model including this vector of means ($\bar{Y}_i$) and a number of student-level variables as predictors is not necessarily equivalent to a regression model with the same student-level variables and a series of dummy variables encoding group membership as predictors; that is,

$$R^2(D_i) = R^2(\bar{Y}_i) \text{ , but} \tag{E-35}$$

$$R^2(S,P,D_i) \geqq R^2(S,P,\bar{Y}_i), \tag{E-36}$$

where,

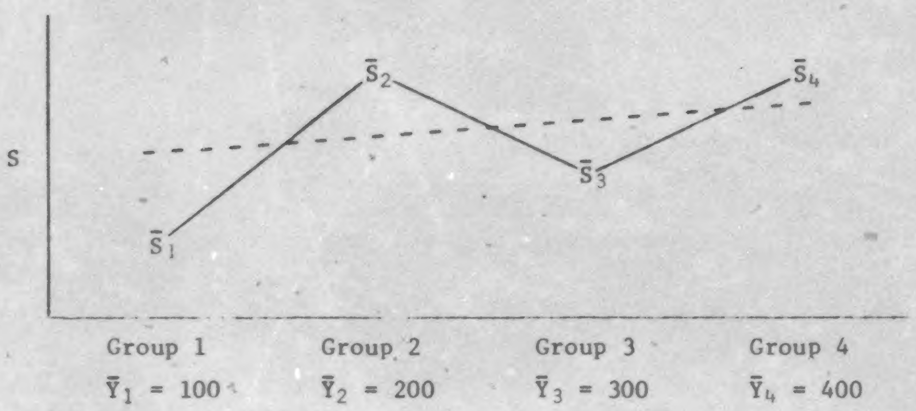
S = student SES,

P = student pretest,

D_i = a series of k dummy variables encoding membership in one of k groups,

$\bar{Y}_i$ = the criterion variable mean for one of k different groups.

One very obvious reason for the difference is that the group-level variable $\bar{Y}_i$ can only have linear correlations with the student-level predictors in the model. Thus, the only confounding that can be present in the model is that which is attributable to a linear correlation of the student-level predictor variables with $\bar{Y}_i$. In other words, although the regression line of Y with the D_i would fall exactly on each $\bar{Y}_i$ and the regression of S with D_i would fall directly on $\bar{S}_i$ (see Levels Analysis discussion), the regression of S on $\bar{Y}_i$ would not pass directly through all $\bar{S}_i$ unless the correlation between $\bar{Y}_i$ and $\bar{S}_i$ were 1.0 -- see Figure E-2. (In other words, $R_s^2(D_i)$ will equal $\eta_s^2(D_j)$ only when the $\bar{s}_i$ fall exactly on a straight line.) This would tend to result in an under-estimation of the degree of confounding between group membership and the student-level predictors in the model, in an over estimation of the uniquenesses for the student-level variables and in an inaccurate assessment of the within-groups confounding for the various combinations of student-level predictors. It is important to remember, however, that the multi-level predictor model with the criterion group means ($\bar{Y}_i$) is really a different analytic model from the multi-level dummy variable model. The mean vector model (i.e., the model with the $\bar{Y}_i$ as one predictor) will have only linear among-group covariance components with the criterion and with the student-level predictors in the model. On the other hand, the dummy variable model will isolate all variance sources that are correlated with group membership, without the requirement that the correlations with the group-level variables (i.e., the dummy variables) have only linear among-group components.



Legend: S = student-level predictor variable, SES;

$\bar{S}_1, \bar{S}_2, \bar{S}_3, \bar{S}_4$ = mean SES scores for stduents in groups 1 to 4;

$\bar{Y}_1, \bar{Y}_2, \bar{Y}_3, \bar{Y}_4$ = criterion variable (Y) mean for all students in groups 1 to 4 respectively;

—— = regression line* for $R_s^2(D_i)$ which falls directly on each $\bar{S}_i$; and

- - - = linear regression line fitted to each $\bar{Y}_i\bar{S}_i$ pair.

*The term "line" is used loosely here. Actually the structure on which all $\bar{S}_i$ values lie is a regression hyperplane since in a levels-analysis each group is represented by a separate (dummy) predictor variable.

Note: Only when $r_{\bar{y}_i\bar{s}_i} = 1.0$ will the two regression lines coincide.

Figure E-2. Example of a student-level variable regressed on a series of dummy variables encoding group membership and on a vector of criterion variable group means.

The preceding discussion has dealt primarily with a multi-level prediction model in which the group-level predictor variables were a series of dummy variables encoding EdExAG group membership. Project LONGSTEP, however, used the Educational Experience Analysis Guide not only to differentiate the groups of students within a school who were receiving different educational treatments but also to document and quantify the educational attributes of these different approaches. It was possible, therefore, to use the scales developed from the EdExAG's as a series of EdExAG-level predictors instead of the dummy variables. Previous sections have shown that $R^2(D_i)$ indexes the proportion of variance in the criterion that is occurring among groups and that can be related to any and all group-level variables. The correlation (squared) between an EdExAG-level variable such as the Utilization of Objectives (X_1) scale and the student-level criterion (Y) will almost always be less than $R^2(D_i)$. In fact, it can be shown that $R^2(D_i)$ and $r^2_{yx_1}$ will be equal only when the linear correlation between the criterion variable group means ($\bar{Y}_i$) and the EdExAG variable is 1.0 (see Fig. E-2). As with all EdExAG-level variables, the correlation between Utilization of Objectives (X_1) and any student-level variable will have only an among-group covariance component. If X_1 is substituted for X_{ij} in equation E-20, the within-group covariance and the within-group variance for X_1 will be equal to zero since a group-level variable, by definition, has no intra-group variation. In terms of equation E-21, then, the r_{yx_1} correlation is equal to

$$r_{yx_1} = \frac{\mathrm{Cov}_{yx_1}(A)}{\sqrt{\mathrm{Var}_{x_1}(A)}\sqrt{\mathrm{Var}_y(T)}} \quad . \qquad \text{(E-37)}$$

Because X_1 is a group-level variable, and,

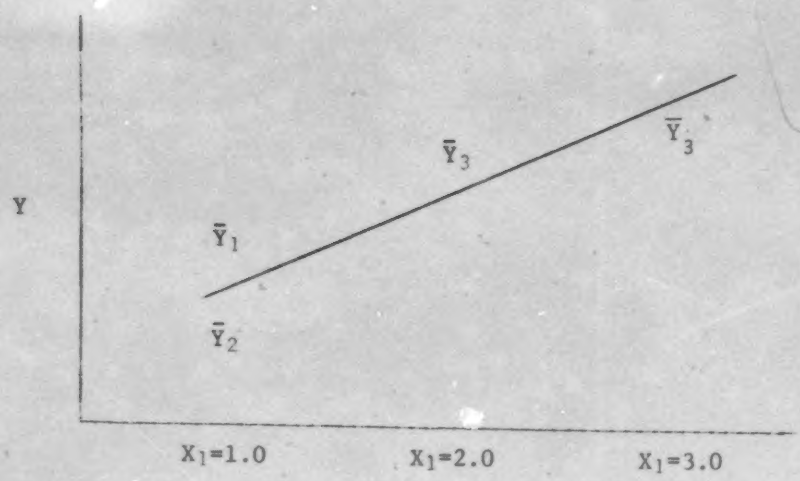
$$\mathrm{Var}_{x_1}(A) = \mathrm{Var}_{x_1}(T), \qquad \text{(E-38)}$$

equation E-37 can also be written as

$$r_{yx_1} = \frac{\mathrm{Cov}_{yx_1}(A)}{\sqrt{\mathrm{Var}_{x_1}(T)}\sqrt{\mathrm{Var}_y(T)}} . \qquad \text{(E-39)}$$

The difference between $r^2_{yx_1}$ and $R^2(D_i)$, however, is not due only to the presence of nonlinear components in the correlation between the dependent variable Y and EdExAG variable X_1. As noted in Chapter IV (See Figure IV-1) in the body of the report and as shown in Figure E-1 in this appendix, the nesting of EdExAg groups under different levels of a given EdExAG scale (because different EdExAG groups could have the same score on an EdExAG scale) meant that criterion variation among EdExAG groups could be attributed to two sources -- the variation among EdExAG groups within levels of the EdExAG variable (pooled across the various levels) and the variation among levels of the EdExAG variable. This among levels variance could also be partitioned into linear and nonlinear components. On the other hand, when the sum of squares attributable to the linear component was divided by the total sum of squares, the resulting index is the square of the criterion/EdExAG variable correlation. Part of the difference between $R^2(D_i)$ and $r^2_{yx_1}$, then, could be due to the fact that different EdExAG groups had the same X^1_1 score, but not the same mean criterion score $(\overline{Y}_i)$.

Examination of Figure E-3 shows a case where the group means with respect to the criterion variable $(\overline{Y}_i)$ are not equal even though the two groups had the same X_1 level (i.e., groups 1 and 2). As noted in Chapter IV, however, an analysis of variance in which the total variation in the criterion variable is partitioned into variation among levels of variable X_1 and within levels of variable X_1 would permit the assessment of nonlinear effects. A variance ratio computed by dividing the sum of squares attributable to difference among levels by the total sum of squares would express the proportion of criterion variance attributable only to linear and nonlinear components of the Y, X_1 relationship. Comparing this ratio with $r^2_{yx_1}$ could then be used to examine the extent to which the criterion variable/EdExAG variable relationship deviated from linearity.



Legend: Y = student-level dependent variable,
$\bar{Y}_1, \bar{Y}_2, \bar{Y}_3, \bar{Y}_4$ = mean of Y for all students in groups 1, 2, 3 and 4,
—— = regression line (if there are unequal numbers of students in the groups, the placement of the regression line will be influenced more by the group with the larger n's).

Figure E-3. Example of the regression of a student-level variable on a group-level variable.

Including one or more quantitative EdExAG-level predictor variables in a prediction equation with one or more student-level variables is similar to using a vector of $\bar{Y}_i$ scores in a multi-level model. Correlations of student-level variables with the EdExAG-level variables will be based on among-group covariation (see equation E-39), that will reflect only a linear trend component. For this reason, commonality analyses of the multi-level predictor models containing the quantitative EdExAG variable will, in essence, involve the assumption that only linear confounding of the student-level predictors with the EdExAG variable is of interest; and, that only linear relationships between the EdExAG scale(s) and the criterion will be examined.

F. Significance Tests with EdExAG-Level Variables

As discussed in Chapter IV of the report, the manner in which EdExAG groups were nested under levels of a given EdExAG scale (see Figure E-1 in this appendix) implied that the most appropriate statistical test for the correlation between a student-level variable and an EdEXAG scale was an F test for linear trend:

$$F = \frac{r^2_{yx_1}}{\left(1 - R^2_{y \cdot d_i}\right) \Big/ (N-k)} , \qquad \text{(E-40)}$$

where,

$r^2_{yx_1}$ = the square of the correlation between a student-level variable Y and an EdExAG-level variable X_1;

$R^2_{y \cdot d_i}$ = the square of the multiple correlation between Y and a series of dummy codes which encode membership in one of k EdExAG groups;

N = the total number of students; and

k = the number of EdExAG groups.

The estimate of random error in the denominator includes only within-EdExAG group variance. The degrees of freedom for this test are 1 and $(N-k)$.

The correlation among EdExAG-level variables themselves also requires some discussion. It should be remembered that although a given analysis data set may contain as many as 2,000 students, the number of different EdExAG groups in which these students were located was considerably smaller. For this reason, the proper degrees of freedom for a t test of the correlation between two EdExAG-level variables would not necessarily be $(N-2)$ where N = the total number of students. Examination of the within-groups and among-groups composition of such a correlation (see Equation E-20) shows that if variable X_1 and variable X_2 are both EdExAG-level scores, all within-group covariance and variance components to the correlation will be equal to zero. In fact, if X_1 and X_2 had been used in Equation E-20, it would have reduced to:

$$r_{x_1x_2} = \frac{\sum_{i=1}^{k} n_i\,(\bar{X}_{1_i} - \bar{\bar{X}}_1)(\bar{X}_{2_i} - \bar{\bar{X}}_2)}{\sum_{i=1}^{k} n_i \sqrt{\dfrac{\sum_{i=1}^{k} n_i(\bar{X}_{1_i} - \bar{\bar{X}}_1)^2}{\sum_{i=1}^{k} n_i}} \sqrt{\dfrac{\sum_{i=1}^{k} n_i(\bar{X}_{2_i} - \bar{\bar{X}}_2)^2}{\sum_{i=1}^{k} n_i}}} \qquad \text{(E-41)}$$

where,

$\bar{X}_{1_i} = X_{1_i}$ = the score for EdExAG group i on EdExAG scale 1;

$\bar{X}_{2_i} = X_{2_i}$ = the score for EdExAG group i on EdExAG scale 2;

n_i = the number of students in group i; and

k = the number of EdExAG groups.

This equation shows that the correlation between two EdExAG-level variables computed over all students is nothing more than a correlation based upon k observations in which each pair of observations on the ith group is weighted by the number of students in that group. And, since each observation or pair of observations does not contribute equally to the variances and covariance in Equation E-41, the appropriate degrees of freedom for EdExAG variable correlations is not merely the number of groups (k) minus 2. Rather, it is necessary to consider the effect that differential weighting of certain scores has had. A somewhat more appropriate approximation to the determination of the degrees of freedom for EdExAG-level intercorrelations is provided by the "effective sample size." (Wilson and Wise, 1975, p. D-4)

The effective sample size, k_{eff}, is defined to be the estimated number of equally weighted cases needed to achieve the level of accuracy obtained by differential weighting of cases. If "accuracy" is measured by the standard error of the mean, $\sigma_{\bar{x}}$, the accuracy of a mean of k weighted observations would be

$$\sigma_{\bar{x}} = \frac{\sigma_x}{\sqrt{k_{eff}}} , \qquad \text{(E-42)}$$

where,

$\sigma_{\bar{x}}$ = the standard error of the mean of variable X;

σ_x = the population standard deviation; and

k_{eff} = the effective sample size.

Squaring Equation E-42 and solving for k_{eff} leaves

$$k_{eff} = \frac{\sigma_x^2}{\sigma_{\bar{x}}^2} . \qquad \text{(E-43)}$$

However,

$$\sigma_{\bar{x}}^2 = \sigma^2\left[\left(\frac{1}{\Sigma W_i}\right) \cdot \left(\Sigma W_i X_i\right)\right] . \qquad \text{(E-44)}$$

where ,

W_i = the weight assigned to the i^{th} score (here, W_i is equal to the number of students in the i^{th} EdExAG group).

Since $\frac{1}{\Sigma W_i}$ is a constant,

$$\sigma_{\bar{x}}^2 = \frac{1}{\left(\sum_{i=1}^{k} W_i\right)^2} \cdot \sigma^2_{(\Sigma W_i X_i)} . \qquad \text{(E-45)}$$

In other words, the variance of the mean of weighted X scores is equal to the variance of the sum of the weighted scores divided by the squared sum of the weights.

If it is then assumed that each W_iX_i is independent of every other W_iX_i and that weight W_i is invariant for group i, Equation E-45 becomes

$$\sigma^2_{\bar{x}} = \frac{1}{\left(\sum_{i=1}^{k} W_i\right)^2} \cdot \sum_{i=1}^{k} (W_i^2 \sigma^2_{x_i}) \;. \tag{E-46}$$

Assuming that the population variances of X_i for all i strata are equal and further assuming that the weights, W_i, are invariant (a reasonable assumption in this instance), Equation E-46 reduces to

$$\sigma^2_{\bar{x}} = \frac{\sum_{i=1}^{k} W_i^2}{\left(\sum_{i=1}^{k} W_i\right)^2} \cdot \sigma^2_{x_i} \;. \tag{E-47}$$

Substituting Equation E-47 into Equation E-43 and solving for k_{eff} leaves,

$$k_{eff} = \frac{\left(\sum_{i=1}^{k} W_i\right)^2}{\sum W_i{}^2} \cdot \frac{\sigma^2_x}{\sigma^2_{x_i}} \;. \tag{E-48}$$

If it is then assumed that $\sigma^2_x = \sigma^2_{x_i}$, Equation E-48 becomes,

$$k_{eff} = \frac{\left(\sum_{i=1}^{k} W_i\right)^2}{\sum W_i^2} \;. \tag{E-49}$$

It should be noted, however, that Equation E-49 undoubtedly results in a lower-bound estimate of the effective sample size -- the reason being that

σ_x^2 will almost certainly be larger than $\sigma_{x_i}^2$ so the ratio, $\sigma_x^2/\sigma_{x_i}^2$, dropped from Equation E-48 is in reality greater than 1.0. Therefore, the effective sample size is somewhat greater than the sum of the weights squared divided by the sum of the squared weights.

In Project LONGSTEP the weights, W_i, are the number of students (n_i) in the k different EdExAG groups. The number of degrees of freedom used for the t test of a given correlation among two EdExAg scales, then, is equal to $k_{eff} - 2$. Again, it should be noted that k_{eff} is only an approximation. First, the assumptions required in the derivation are not entirely appropriate given the particular structure of the LONGSTEP EdExAG-level data. Second, the definition of k_{eff} was based upon the standard error of the mean and not the sampling error of a Pearson r. Since the effective sample size for EdExAG-level correlations (k_{eff}) will usually be less than the actual number of EdExAG groups (k), the use of k_{eff} in the determination of the degrees of freedom for a particular correlation means that the significance test of that r will be conservative.

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APPENDIX IV-F

Number of Students, Schools and EdExAG Groups per Site

TABLE 1

Number of Students, Schools and EdExAG Groups per Site - Cohort 1, Spring 1972, Reading Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	-	-	-
2	4	6	232 (6 - 73)
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	-	-	-
9	2	2	78 (35 - 43)
10	-	-	-
11	1	1	72
12	2	2	211 (101 - 110)
13	4	7	198 (2 - 88)

---

[*] The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 2

Number of Students, Schools and EdExAG Groups per Site - Cohort 1, Spring 1973, Reading Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	-	-	-
2	4	4	194 (31 - 62)
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	-	-	-
9	2	3	80 (17 - 40)
10	-	-	-
11	1	1	85
12	2	2	219 (107 - 112)
13	4	7	189 (7 - 78)

---

*The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 3

Number of Students, Schools and EdExAG Groups per Site - Cohort 4, Spring 1972, Reading Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	7	8	284 (14 - 58)
2	4	5	268 (21 - 86)
3	1	1	222
4	1	1	26
5	2	2	40 (17 - 23)
6	4	5	114 (8 - 47)
7	3	3	128 (41 - 46)
8	1	1	29
9	2	2	98 (45 - 53)
10	2	2	155 (33 - 122)
11	2	2	153 (63 - 90)
12	2	2	233 (116 - 117)
13	4	8	202 (12 - 86)

*The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 4

Number of Students, Schools and EdExAG Groups per Site - Cohort 4, Spring 1973, Reading Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	7	7	275 (13 - 65)
2	4	4	213 (20 - 68)
3	1	1	259
4	1	1	28
5	2	2	38 (19 - 19)
6	4	4	117 (7 - 59)
7	3	4	149 (23 - 54)
8	1	1	32
9	2	3	112 (25 - 60)
10	2	2	140 (50 - 90)
11	2	3	180 (5 - 102)
12	1	6	207 (29 - 39)
13	4	6	175 (13 - 78)

---

*The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 5

Number of Students, Schools and EdExAG Groups per Site - Cohort 6, Spring 1972, Reading Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	1	2	430 (110 - 320)
2	-	-	-
3	1	1	232
4	-	-	-
5	-	-	-
6	-	-	-
7	1	1	158
8	-	-	-
9	1	1	234
10	1	1	110
11	-	-	-
12	1	2	191 (86 - 105)
13	1	3	165 (50 - 61)

---

*The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 6

Number of Students, Schools and EdExAG Groups per Site - Cohort 6, Spring 1973, Reading Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	1	1	389
2	-	-	-
3	1	1	237
4	-	-	-
5	-	-	-
6	-	-	-
7	1	1	162
8	-	-	-
9	1	1	236
10	1	1	125
11	-	-	-
12	1	6	267 (41 - 48)
13	1	2	136 (33 - 103)

---

[*] The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 7

Number of Students, Schools and EdExAG Groups per Site - Cohort 1, Spring 1972, Language Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	-	-	-
2	4	6	232 (6 - 73)
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	-	-	-
9	2	2	78 (35 - 43)
10	-	-	-
11	1	1	67
12	2	2	213 (103 - 110)
13	4	7	197 (2 - 88)

---

*The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 8

Number of Students, Schools and EdExAG Groups per Site - Cohort 1, Spring 1973, Language Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	-	-	-
2	4	4	192 (31 - 61)
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	-	-	-
9	2	3	80 (17 - 40)
10	-	-	-
11	1	1	80
12	2	2	220 (107 - 113)
13	4	7	183 (5 - 78)

---

*The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 9

Number of Students, Schools and EdExAG Groups per Site - Cohort 4, Spring 1972, Language Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	7	8	292 (14 - 59)
2	4	5	273 (22 - 88)
3	1	1	222
4	1	1	27
5	2	2	40 (17 - 23)
6	4	5	116 (8 - 49)
7	3	3	131 (42 - 47)
8	1	1	31
9	2	2	104 (50 - 54)
10	2	2	154 (33 - 121)
11	2	2	158 (66 - 92)
12	2	2	242 (120 - 122)
13	4	8	205 (12 - 88)

*The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 10

Number of Students, Schools and EdExAG Groups per Site - Cohort 4, Spring 1973, Language Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	7	7	274 (12 - 65)
2	4	4	213 (19 - 68)
3	1	1	253
4	1	1	28
5	2	2	37 (18 - 19)
6	4	4	117 (7 - 59)
7	3	4	148 (23 - 53)
8	1	1	32
9	2	3	113 (25 - 61)
10	2	2	136 (47 - 89)
11	2	3	175 (5 - 100)
12	1	6	207 (29 - 39)
13	4	6	169 (13 - 75)

---

*The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 11

Number of Students, Schools and EdExAG Groups per Site - Cohort 6, Spring 1972, Language Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	1	2	430 (111 - 319)
2	-	-	-
3	1	1	228
4	-	-	-
5	-	-	-
6	-	-	-
7	1	1	161
8	-	-	-
9	1	1	227
10	1	1	103
11	-	-	-
12	1	2	186 (84 - 102)
13	1	3	156 (47 - 57)

---

*The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 12

Number of Students, Schools and EdExAG Groups per Site - Cohort 6, Spring 1973, Language Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	1	1	375
2	-	-	-
3	1	1	211
4	-	-	-
5	-	-	-
6	-	-	-
7	1	1	165
8	-	-	-
9	1	1	238
10	1	1	125
11	-	-	-
12	1	6	266 (42 - 47)
13	1	2	127 (27 - 100)

---

* The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 13

Number of Students, Schools and EdExAG Groups per Site - Cohort 1, Spring 1972, Arithmetic Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	-	-	-
2	4	6	227 (5 - 72)
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	-	-	-
9	2	2	76 (33 - 43)
10	-	-	-
11	1	1	67
12	2	2	191 (88 - 103)
13	4	7	191 (2 - 85)

---

*The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 14

Number of Students, Schools and EdExAG Groups per Site - Cohort 1, Spring 1973, Arithmetic Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	-	-	-
2	4	4	187 (29 - 60)
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	-	-	-
9	2	2	90 (39 - 51)
10	-	-	-
11	1	1	77
12	2	2	206 (94 - 112)
13	4	8	181 (6 - 73)

*The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 15

Number of Students, Schools and EdExAG Groups per Site - Cohort 4, Spring 1972, Arithmetic Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	7	8	292 (14 - 58)
2	4	5	263 (22 - 91)
3	1	1	219
4	1	1	27
5	2	2	42 (18 - 24)
6	4	5	114 (8 - 49)
7	3	3	128 (41 - 44)
8	1	1	30
9	2	2	101 (47 - 54)
10	2	2	150 (32 - 118)
11	2	2	139 (58 - 81)
12	2	2	236 (117 - 119)
13	4	8	202 (12 - 86)

*The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 16

Number of Students, Schools and EdExAG Groups per Site - Cohort 4, Spring 1973, Arithmetic Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	7	7	272 (13 - 58)
2	4	4	206 (20 - 68)
3	1	1	261
4	1	1	27
5	2	2	39 (19 - 20)
6	4	4	115 (7 - 56)
7	3	3	143 (39 - 53)
8	1	1	32
9	2	3	114 (18 - 60)
10	2	2	161 (49 - 112)
11	2	2	194 (91 - 103)
12	1	7	211 (22 - 53)
13	4	6	189 (18 - 78)

---

*The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 17

Number of Students, Schools and EdExAG Groups per Site - Cohort 6, Spring 1972, Arithmetic Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students[*]
1	1	1	430
2	-	-	-
3	1	1	246
4	-	-	-
5	-	-	-
6	-	-	-
7	1	1	154
8	-	-	-
9	1	1	220
10	1	2	84 (4 - 80)
11	-	-	-
12	1	1	150
13	1	3	159 (49 - 55)

---

[*] The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

TABLE 18

Number of Students, Schools and EdExAG Groups per Site - Cohort 6, Spring 1973, Arithmetic Total Score Analysis

Site	Number of Schools	Number of EdExAG Groups	Number of Students*
1	1	2	389 (140 - 249)
2	-	-	-
3	1	2	238 (26 - 212)
4	-	-	-
5	-	-	-
6	-	-	-
7	1	1	152
8	-	-	-
9	1	1	224
10	1	2	123 (36 - 87)
11	-	-	-
12	1	7	253 (29 - 45)
13	1	2	126 (12 - 114)

---

[*] The minimum and maximum number of students in these EdExAG groups are shown in parentheses if more than one group is present in a site.

APPENDIX IV-G

SES and Pretest Moderator Analysis Results: Level of Innovation and Degree of Individualization Growth Models

TABLE 1

SES Moderator Analyses, Level of Innovation Growth Model - Reading Total Score Analyses

Cohort	Posttest Year	R^2_{FM}	R^2_{RM}	F	df	p
1	SP72	.26489	.26159	0.88	4;781	NS
	SP73	.61551	.61412	0.68	4;757	NS
4	SP72	.71397	.71267	2.21	4;1942	NS
	SP73	.73945	.73583	6.65	4;1915	<.01
6	SP72	.74527	.74480	0.70	4;1510	NS
	SP73	.75108	.74937	2.65	4;1542	<.05

TABLE 2

SES Moderator Analyses, Degree of Individualization Growth Model - Reading Total Score Analyses

Cohort	Posttest Year	R^2_{FM}	R^2_{RM}	F	df	p
1	SP72	.26357	.26051	0.81	4;781	NS
	SP73	.60379	.60052	3.31	4;757	<.05
4	SP72	.71358	.71266	1.56	4;1942	NS
	SP73	.73984	.73740	4.49	4;1915	<.01
6	SP72	.74519	.74471	0.71	4;1510	NS
	SP73	.75177	.74965	3.29	4;1542	<.05

TABLE 3

Pretest Moderator Analyses, Level of Innovation Growth Model - Reading Total Score Analyses

Cohort	Posttest Year	R^2_{FM}	R^2_{RM}	F	df	p
1	SP72	.26821	.26159	1.77	4;781	NS
	SP73	.61569	.61412	0.77	4;757	NS
4	SP72	.71281	.71267	0.24	4;1942	NS
	SP73	.73826	.73583	4.45	4;1915	<.01
6	SP72	.74553	.74480	1.08	4;1510	NS
	SP73	.75074	.74937	2.12	4;1542	NS

TABLE 4

Pretest Moderator Analyses, Degree of Individualization Growth Model - Reading Total Score Analyses

Cohort	Posttest Year	R^2_{FM}	R^2_{RM}	F	df	p
1	SP72	.26658	.26051	1.62	4;781	NS
	SP73	.60152	.60052	0.47	4;757	NS
4	SP72	.71287	.71266	0.35	4;1942	NS
	SP73	.73972	.73740	4.27	4;1915	<.01
6	SP72	.74551	.74471	1.19	4;1510	NS
	SP73	.75096	.74965	2.03	4;1542	NS

TABLE 5

SES Moderator Analyses, Level of Innovation Growth Model - Language Total Score Analyses

Cohort	Posttest Year	R^2_{FM}	R^2_{RM}	F	df	p
1	SP72	.25060	.24610	1.17	4;777	NS
	SP73	.64544	.63742	4.21	4;745	<.01
4	SP72	.69896	.69472	7.00	4;1985	<.01
	SP73	.70701	.70346	5.73	4;1892	<.01
6	SP72	.64832	.64501	3.49	4;1481	<.01
	SP73	.67914	.67884	0.35	4;1497	NS

TABLE 6

SES Moderator Analyses, Degree of Individualization Growth Model - Language Total Score Analyses

Cohort	Posttest Year	R^2_{FM}	R^2_{RM}	F	df	p
1	SP72	.24926	.24460	1.21	4;777	NS
	SP73	.64535	.63564	5.10	4;745	<.01
4	SP72	.69945	.69496	7.41	4;1985	<.01
	SP73	.70643	.70411	3.74	4;1892	<.01
6	SP72	.64818	.64505	3.29	4;1481	<.05
	SP73	.67925	.67871	0.63	4;1497	NS

TABLE 7

Pretest Moderator Analyses, Level of Innovation Growth Model - Language Total Score Analyses

Cohort	Posttest Year	R^2_{FM}	R^2_{RM}	F	df	p
1	SP72	.25749	.24610	3.00	4;777	<.05
	SP73	.64549	.63742	4.24	4;745	<.01
4	SP72	.69758	.69472	4.69	4;1985	<.01
	SP73	.70538	.70346	3.08	4;1892	<.05
6	SP72	.64569	.64501	0.71	4;1481	NS
	SP73	.67908	.67884	0.28	4;1497	NS

TABLE 8

Pretest Moderator Analyses, Degree of Individualization Growth Model - Language Total Score Analyses

Cohort	Posttest Year	R^2_{FM}	R^2_{RM}	F	df	p
1	SP72	.25545	.24460	2.83	4;777	<.05
	SP73	.64366	.63564	4.19	4;745	<.01
4	SP72	.69800	.69496	5.00	4;1985	<.01
	SP73	.70556	.70411	2.33	4;1892	NS
6	SP72	.64572	.64505	0.70	4;1481	NS
	SP73	.67922	.67871	0.59	4;1497	NS

TABLE 9

SES Moderator Analyses, Level of Innovation Growth Model - Arithmetic Total Score Analyses

Cohort	Posttest Year	R^2_{FM}	R^2_{RM}	F	df	p
1	SP72	.26280	.24319	4.93	4;742	$<.01$
	SP73	.57272	.56801	2.01	4;731	NS
4	SP72	.63744	.63481	3.51	4;1933	$<.01$
	SP73	.67577	.67272	4.60	4;1954	$<.01$
6	SP72	.67573	.67404	1.87	4;1433	NS
	SP73	.74212	.74098	1.65	4;1495	NS

TABLE 10

SES Moderator Analyses, Degree of Individualization Growth Model - Arithmetic Total Score Analyses

Cohort	Posttest Year	R^2_{FM}	R^2_{RM}	F	df	p
1	SP72	.26332	.24319	5.07	4;742	$<.01$
	SP73	.55826	.55173	2.70	4;731	$<.05$
4	SP72	.63712	.63552	2.13	4;1933	NS
	SP73	.67503	.67196	4.62	4;1954	$<.01$
6	SP72	.67135	.66977	1.72	4;1433	NS
	SP73	.74296	.74174	1.77	4;1495	NS

TABLE 11

Pretest Moderator Analyses, Level of Innovation Growth Model - Arithmetic Total Score Analyses

Cohort	Posttest Year	R^2_{FM}	R^2_{RM}	F	df	p
1	SP72	.25156	.24319	2.07	4;742	NS
	SP73	.57293	.56801	2.10	4;731	NS
4	SP72	.63505	.63481	0.32	4;1933	NS
	SP73	.67666	.67272	5.96	4;1954	$<.01$
6	SP72	.67637	.67404	2.58	4;1433	$<.05$
	SP73	.74223	.74098	1.96	4;1495	NS

TABLE 12

Pretest Moderator Analyses, Degree of Individualization Growth Model - Arithmetic Total Score Analyses

Cohort	Posttest Year	R^2_{FM}	R^2_{RM}	F	df	p
1	SP72	.25125	.24319	2.00	4;742	NS
	SP73	.55731	.55173	2.30	4;731	NS
4	SP72	.63579	.63552	0.36	4;1933	NS
	SP73	.67530	.67196	5.02	4;1954	$<.01$
6	SP72	.67236	.66977	2.83	4;1433	$<.05$
	SP73	.74308	.74174	1.95	4;1495	NS

APPENDIX IV-H

Project LONGSTEP Profile Variables and Variable Abbreviation Summary

Project LONGSTEP Profile Variables and Variable Abbreviation Summary+

Variable Abbreviation	Variable Label
COGNITIVE OUTCOMES:	
PCT71	Percentage of School Year Completed Prior to Testing, Spring 1971 (SP71)
PCT72	Percentage of School Year Completed Prior to Testing, Spring 1972 (SP72)
RTOT71	Reading Total for SP71
RTOT72	Reading Total for SP72
RESR71	RTOT71 Residualized for Time of Testing
RESR72	RTOT72 Residualized for Time of Testing
R71R72	RESR72 Residualized for RESR71
REXP72	RESR72 Residualized for Pretest and COMPSES
ATTITUDINAL OUTCOMES:	
ATS71	Attitude toward School SP71
ATS72	Attitude toward School SP72
ATLA71	Attitude toward Language Arts SP71
ATLA72	Attitude toward Language Arts SP72
RI71	Reading Interest SP71
RI72	Reading Interest SP72
ATM71	Attitude toward Math SP71
ATM72	Attitude toward Math SP72
SI71	Social Identity SP71
SI72	Social Identity SP72
STUDENT ATTRIBUTES:	
COMPSES	Composite of Student's SES
ETH	Student's Ethnic Group (0 = nonwhite; 1 = white)
SEX	Student's Sex (0 = male; 1 = female)
EdExAG VARIABLES:	
E2UO	Utilization of Objectives
E2EITC	External Influence on Treatment Characteristics

Variable Abbreviation	Variable Label
EdExAG VARIABLES (cont.)	
E2SME	Staff and Materials Evaluation
E2TE	Treatment Evaluation
E2RT	Resistance to Treatment
E2SSS	School Support Staff
E2IDM^{++}	Individualization in Decision Making
E2TLDM	Teacher or Locally Developed Materials
E2IIP^{++}	Individualization of Instructional Pace
E2UST	Use of Students in Treatment
E2UTE	Utilization of Treatment Evaluation
E2UCR	Use of Community Resources
E2SC	Scheduling Characteristics
E2UEI	Use of External Incentives
E2UPA^{++}	Use of Performance Agreements
E2CGO	Classroom Group Organization
E2SCD	School-Classroom Design
E2TUC	Teaching Unit Composition
E2STI	Status of Treatment Implementation
E2CIP	Completeness of Instructional Package
E2TIST	Teacher In-Service Training
E2AL	Accessibility of Library
E2UMC	Use of Media Center
E2USE^{++}	Utilization of Student Evaluation
E2AE	Affective Evaluation
E2MFR	Mechanism for Reinforcement
E2OFP	Opportunity for Practice
E2SUM10 (and LI)	Level of Innovation -- Sum of the 10 key innovation scales
E2SUM04 (and DI)	Degree of Individualization -- Sum of the 4 individualization scales

Variable Abbreviation	Variable Label
TREATMENT AND STAFF EXPOSURE VARIABLES:	
E2NDAYY	Number of School Days Per Year
E2NMIN	Number of Minutes Per Day
E2SCHW	Number of Student Contact Hours Per Week
E2TSCHR	Teacher/Student Contact Hour Ratio
E2ASCHR	Paid Aide/Student Contact Hour Ratio
E2VSCHR	Volunteer/Student Contact Hour Ratio
E2HSCHR	Student Helper/Student Contact Hour Ratio
CLASSROOM OBSERVATION VARIABLES:	
C2UM	Use of Materials
C2CE	Classroom Environment
C2SA	Study Arrangements
C2AR	Access to Resources
TEACHER VARIABLES:	
T2NTCHRS	Number of Teachers
T2AGE	Teacher's Age
T2TSB	Teacher's Socioeconomic Background
T2TQ	Teaching Qualifications
T2CPR	Current Professional Reading
T2TAUP	Teachers Associations or Union Participation
T2SR	School Reputation
T2AS	Administrative Support

+The variables and variable abbreviations listed are for the Spring, 1972 posttest analysis (SP72) of the Reading Total score. The "E2" which precedes the EdExAG variable abbreviations, the "T2" which precedes the teacher variable abbreviations, and the "C2" which precedes the classroom observation measures identify the data collection year as Year 2, 1971-72.

Underlined are the key measures of innovation -- that is, the ten scales forming the superindex, Level of Innovation.

++Primary measure of individualization -- that is, one of four scales forming the superindex, Degree of Individualization.

APPENDIX V-A

Posttest/Norm and Pretest/Norm Comparisons - Reading Total Score Analyses

TABLE V-A-1

Posttest/Norm and Pretest/Norm Comparisons - Reading Total Score Analyses

	Cohort 1		Cohort 4		Cohort 6	
	SP72	SP73	SP72	SP73	SP72	SP73
Posttest Mean/ Norm Difference[1]	18.48	25.16	12.51	16.90	5.27	9.93
Posttest Difference Ratio[2]	.29	.38	.18	.22	.07	.12
Pretest Mean/ Norm Difference	*	16.96	18.91	18.73	22.80	19.45
Pretest Difference Ratio[3]	*	.27	.29	.28	.31	.27

[1] Norm based on 50th percentile for spring testing.

[2] $$\frac{\bar{X}_{posttest} - Norm}{SD_{posttest}}$$

[3] $$\frac{\bar{X}_{pretest} - Norm}{SD_{pretest}}$$

*CTMM was used.

APPENDIX V-B

Maximum Possible Posttest and Pretest Mean Shifts Attributable to Test Topout Effects - Reading Total Score Analyses

TABLE V-B-1

Maximum Possible Posttest and Pretest Mean Shifts Attributable to Test Topout Effects - Reading Total Score Analyses

Cohort, Analysis Sample[1]	Analysis Sample			Analysis Sample and Topouts[2]			Mean Difference[3]	
	$\bar{X}_{\text{posttest}}$	$\bar{X}_{\text{pretest}}$	N	$\bar{X}_{\text{posttest}}$	$\bar{X}_{\text{pretest}}$	N	Posttest	Pretest
Cohort 1, SP73[4]	400.66	338.46	767	400.66	338.46	767	.00	.00
Cohort 4, SP72	469.51	437.91	1952	476.98	442.25	2006	7.47	4.34
Cohort 4, SP73	507.40	475.73	1925	509.36	477.83	1940	1.96	2.10
Cohort 6, SP72	531.27	513.30	1520	534.30	515.88	1536	3.03	2.58
Cohort 6, SP73	563.43	545.45	1552	565.31	547.40	1563	1.88	1.95

[1] Cohort 1, SP72 is not included because the pretest was the CTMM and the posttest, the CTBS.

[2] Means shown here were computed assuming that students who topped out obtained the maximum pretest and posttest scores.

[3] Absolute value of the difference.

[4] No topouts in this sample.

APPENDIX V-C

Commonality Analysis of SES — Reading Total Score Analyses

TABLE V-C-1

Commonality Analysis of SES -- Cohort 1, Spring 1972, Reading Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.04208	.36202	.00083
C(P,D)	-.01326	-.01326	
C(P,T)	.00063		.00063
C(D,T)		.02692	.02692
C(P,D,T)	-.00092	-.00092	-.00092
$R^2(X_i)$	.02854	.37476	.02745

$R^2(P,D,T) = .41830$

TABLE V-C-2

Commonality Analysis of SES -- Cohort 1, Spring 1973 Reading Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.04142	.26155	.00386
C(P,D)	.09039	.09039	
C(P,T)	-.00105		-.00105
C(D,T)		.03960	.03960
C(P,D,T)	.03338	.03338	.03338
$R^2(X_i)$	.16414	.42493	.07580

$R^2(P,D,T) = .46916$

TABLE V-C-3

Commonality Analysis of SES -- Cohort 4, Spring 1972, Reading Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.02458	.38609	.00066
C(P,D)	.08403	.08403	
C(P,T)	.00079		.00079
C(D,T)		.04000	.04000
C(P,D,T)	.00639	.00639	.00639
$R^2(X_i)$	.11579	.51652	.04785

$R^2(P,D,T) = .54255$

TABLE V-C-4

Commonality Analysis of SES -- Cohort 4, Spring 1973, Reading Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.02626	.31398	.00034
C(P,D)	.08349	.08349	
C(P,T)	.00044		.00044
C(D,T)		.08126	.08126
C(P,D,T)	.03062	.03062	.03062
$R^2(X_i)$	.14082	.50935	.11266

$R^2(P,D,T) = .53639$

TABLE V-C-5

Commonality Analysis of SES -- Cohort 6, Spring 1972, Reading Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.03614	.17901	.00004
C(P,D)	.03848	.03848	
C(P,T)	.00042		.00042
C(D,T)		.05911	.05911
C(P,D,T)	.02737	.02737	.02737
$R^2(X_i)$	.10241	.30397	.08694

$R^2(P,D,T) = .34057$

TABLE V-C-6

Commonality Analysis of SES -- Cohort 6, Spring 1973, Reading Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.05036	.19919	.00046
C(P,D)	.05066	.05066	
C(P,T)	.00067		.00067
C(D,T)		.03632	.03632
C(P,D,T)	.02532	.02532	.02532
$R^2(X_i)$	.12701	.31149	.06277

$R^2(P,D,T) = .36298$

APPENDIX V-D

Commonality Analysis of Pretest -- Reading Total Score Analyses

TABLE V-D-1

Commonality Analysis of Pretest -- Cohort 1, Spring 1972, Reading Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.06243	.09922	.00565
C(S,D)	-.03394	-.03304	
C(S,T)	.00126		.00126
C(D,T)		.00372	.00372
C(S,D,T)	-.00211	-.00211	-.00211
$R^2(X_i)$	.02764	.06779	.00852

$R^2(S,D,T) = .13712$

TABLE V-D-2

Commonality Analysis of Pretest -- Cohort 1, Spring 1973, Reading Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.05778	.08497	.01015
C(S,D)	.07954	.07954	
C(S,T)	-.00111		-.00111
C(D,T)		.00024	.00024
C(S,D,T)	.02794	.02794	.02794
$R^2(X_i)$	.16414	.19268	.03722

$R^2(S,D,T) = .25950$

TABLE V-D-3

Commonality Analysis of Pretest -- Cohort 4, Spring 1972, Reading Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.04302	.07226	.01416
C(S,D)	.06939	.06939	
C(S,T)	.00211		.00211
C(D,T)		-.00298	-.00298
C(S,D,T)	.00128	.00128	.00128
$R^2(X_i)$	.11579	.13994	.01457

$R^2(S,D,T) = .19923$

TABLE V-D-4

Commonality Analysis of Pretest -- Cohort 4, Spring 1973, Reading Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.04404	.07381	.00903
C(S,D)	.07611	.07611	
C(S,T)	.00122		.00122
C(D,T)		-.00107	-.00107
C(S,D,T)	.01945	.01945	.01945
$R^2(X_i)$	.14082	.16831	.02864

$R^2(S,D,T) = .22260$

TABLE V-D-5

Commonality Analysis of Pretest -- Cohort 6, Spring 1972, Reading Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.04703	.02891	.00705
C(S,D)	.03192	.03192	
C(S,T)	.00094		.00094
C(D,T)		.00341	.00341
C(S,D,T	.02252	.02252	.02252
$R^2(X_i)$	.10241	.08676	.03391

$R^2(S,D,T) = .14178$

TABLE V-D-6

Commonality Analysis of Pretest -- Cohort 6, Spring 1973, Reading Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.06760	.00865	.00930
C(S,D)	.03674	.03674	
C(S,T)	.00159		.00159
C(D,T)		-.00002	-.00002
C(S,D,T)	.02108	.02108	.02108
$R^2(X_i)$	.12701	.06646	.03194

$R^2(S,D,T) = .14494$

APPENDIX V-E

Intercorrelations Among All Key Analysis Variables -- Reading Total Score Analyses *

*Variable names for the abbreviations used are found in Appendix IV-H. Methods to be used for testing the statistical significance of these correlations vary depending upon whether or not the variables were measured at the student level or at the EdExAG group level. These issues are discussed in Chapter IV and in Appendix IV-E.

Critical values for intercorrelations of EdExAG variable with SES, pretest and posttest are found in Chapter V in the body of the report as are the critical values for correlations among the student level variables. Critical values for intercorrelations of EdExAG-level variables with EdExAG-level variables are noted on each of the following tables, along with the effective sample size, k_{eff} (see Appendix IV-E). EdExAG variable correlations exceeding the noted values are statistically significant at $p < .05$ (two-tailed) with $(k_{eff}-2)$ degrees of freedom.

TABLE V-E-1

Intercorrelations among the Key Analysis Variables -- Cohort 1, Spring, 1972 Reading Total Score Analysis

$[\ r\ (p<.05) = .576,\ k_{eff} = 12\ ]$

	RESR72	COMPSES	RESR71	SUM04	SUM10	E2NMIN	T2TQ	E2UO	E2IDM	E2TLDM	E2IIP	E2SC
RESR72	1.00000	0.40532	0.36606	0.05834	0.07999	-0.05320	0.01957	0.13166	-0.05239	-0.01203	0.09752	0.07496
COMPSES	0.40532	1.00000	0.16893	0.10881	0.14205	-0.14550	0.14420	0.30972	-0.01943	0.03363	0.13002	-0.03000
RESR71	0.36606	0.16893	1.00000	-0.09321	-0.09775	-0.03645	0.03878	-0.06307	-0.05939	-0.10574	-0.00911	-0.06061
SUM04	0.05834	0.10881	-0.09321	1.00000	0.96436	-0.01641	0.13860	0.74650	0.71930	0.60428	0.68097	0.69821
SUM10	0.07999	0.14205	-0.09775	0.96436	1.00000	-0.14844	0.04944	0.82855	0.66565	0.58860	0.60003	0.76168
E2NMIN	-0.05320	-0.14550	-0.03645	-0.01641	-0.14844	1.00000	-0.00108	-0.15953	-0.09481	0.07027	0.09596	-0.28479
T2TQ	0.01957	0.14420	0.03878	0.13860	0.04944	-0.00108	1.00000	0.04628	0.11291	0.06476	0.15066	-0.12632
E2UO	0.13166	0.30972	-0.06307	0.74650	0.82855	-0.15953	0.04628	1.00000	0.35253	0.25908	0.62203	0.47224
E2IDM	-0.05239	-0.01943	-0.05939	0.71930	0.66565	-0.09481	0.11291	0.35253	1.00000	0.63892	0.26413	0.41965
E2TLDM	-0.01203	0.03363	-0.10574	0.60428	0.58860	0.07027	0.06476	0.25908	0.63892	1.00000	0.06031	0.33437
E2IIP	0.09752	0.13002	-0.00911	0.68097	0.60003	0.09596	0.15066	0.62203	0.26413	0.06031	1.00000	0.49149
E2SC	0.07496	-0.03000	-0.06061	0.69821	0.76168	-0.28479	-0.12632	0.47224	0.41965	0.33437	0.49149	1.00000
E2UPA	0.01858	-0.04146	-0.08910	0.79768	0.83090	-0.24885	-0.00630	0.49070	0.51450	0.50062	0.35475	0.85692
E2CGO	-0.02932	-0.15797	0.07320	0.52177	0.50746	-0.06496	0.01193	0.46849	0.44458	0.02923	0.40353	0.37344
E2TUC	0.09019	0.24192	-0.11943	0.57921	0.69761	-0.22476	-0.00655	0.64460	0.48946	0.44610	0.00004	0.35272
E2CIP	0.08513	0.21923	-0.12812	0.39088	0.46815	-0.18751	-0.02092	0.40558	0.08437	0.32676	0.39120	0.51238
E2USE	0.08964	0.23092	-0.12233	0.77039	0.76894	0.17159	0.14881	0.71047	0.44708	0.65248	0.32207	0.29855
T2AGE	-0.00053	0.02246	0.07614	0.22530	0.14275	0.06306	0.60489	0.08443	0.11773	0.07045	0.19129	0.02925
T2TSD	-0.02957	-0.00239	0.01491	-0.26160	-0.20472	-0.11084	-0.13456	-0.05951	-0.22793	-0.15907	-0.15274	-0.10055
PCT71	0.17369	0.46281	-0.00000	-0.12483	-0.15332	0.07383	0.31799	0.27473	-0.31926	-0.28288	0.15497	-0.44398
PCT72	0.00000	0.09133	0.11926	-0.22184	-0.30248	0.11616	0.26242	0.10115	-0.32564	-0.48430	0.28065	-0.43538
MAL71	0.39505	0.26542	0.97613	-0.11809	-0.12872	-0.01954	0.10692	-0.00139	-0.12732	-0.16465	0.02476	-0.15559
RTOT72	0.99558	0.41211	0.37565	0.03724	0.05123	-0.04262	0.04413	0.14058	-0.08274	-0.05746	0.12344	0.03374

	E2UPA	E2CGO	E2TUC	E2CIP	E2USE	T2AGE	T2TSD	PCT71	PCT72	MAL71	RTOT72
RESR72	0.01858	-0.02932	0.09019	0.08513	0.08964	-0.00053	-0.02957	0.17369	0.00000	0.39505	0.99558
COMPSES	-0.04146	-0.15797	0.24192	0.21923	0.23092	0.02246	-0.00239	0.46281	0.09133	0.26542	0.41211
RESR71	-0.08910	0.07320	-0.11943	-0.12812	-0.12233	0.07614	0.01491	-0.00000	0.11926	0.97613	0.37565
SUM04	0.79768	0.52177	0.57921	0.39088	0.77039	0.22530	-0.26160	-0.12483	-0.22184	-0.11809	0.03724
SUM10	0.83090	0.50746	0.69761	0.46815	0.76894	0.14275	-0.20472	-0.15332	-0.30248	-0.12872	0.05123
E2NMIN	-0.24885	-0.06496	-0.22476	-0.18751	0.17159	0.06306	-0.11084	0.07383	0.11616	-0.01954	-0.04262
T2TQ	-0.00630	0.01143	-0.00655	-0.02092	0.14881	0.60489	-0.13456	0.31799	0.26242	0.10692	0.04413
E2UO	0.49070	0.46849	0.64460	0.40558	0.71047	0.08443	-0.05951	0.27473	0.10115	-0.00169	0.14058
E2IDM	0.51450	0.44458	0.48946	0.08437	0.44708	0.11773	-0.22793	-0.31926	-0.32564	-0.12732	-0.08274
E2TLDM	0.50062	0.02923	0.44610	0.32676	0.65248	0.07045	-0.15907	-0.23288	-0.48430	-0.16465	-0.05746
E2IIP	0.35475	0.40353	0.00004	0.39120	0.32207	0.19129	-0.15274	0.15497	0.28065	0.02476	0.12344
E2SC	0.35692	0.33344	0.35272	0.51238	0.29855	0.02925	-0.10055	-0.44398	-0.43538	-0.15559	0.03374
E2UPA	1.00000	0.40911	0.55465	0.40551	0.51326	0.13229	-0.13739	-0.43222	-0.50066	-0.18085	-0.02852
E2CGO	0.40911	1.00000	0.29161	-0.40219	0.29860	0.24843	-0.10470	-0.24493	0.17300	0.01825	-0.01294
E2TUC	0.55465	0.29161	1.00000	0.18682	0.71847	0.04710	-0.15403	-0.02607	-0.48188	-0.12224	0.04454
E2CIP	0.40551	-0.40219	0.18682	1.00000	0.26765	-0.17932	-0.05975	0.01825	-0.33688	-0.12110	0.05312
E2USE	0.51326	0.29860	0.71847	0.26765	1.00000	0.21643	-0.26463	0.16316	-0.17981	-0.08397	0.07236
T2AGE	0.13229	0.24843	0.04710	-0.17932	0.21643	1.00000	-0.40823	0.11757	0.21075	0.09986	0.01927
T2TSD	-0.13739	-0.10470	-0.15403	-0.05975	-0.26463	-0.40823	1.00000	0.03652	0.16008	0.02249	-0.01440
PCT71	-0.43222	-0.24493	-0.02607	0.01825	0.16316	0.11757	0.03652	1.00000	0.65293	0.21720	0.23425
PCT72	-0.50056	0.17300	-0.48188	-0.33688	-0.17981	0.21075	0.16008	0.65293	1.00000	0.25824	0.09392
MAL71	-0.18085	0.01825	-0.12224	-0.12110	-0.08397	0.09986	0.02249	0.21720	0.25824	1.00000	0.41756
RTOT72	-0.02852	-0.01294	0.04454	0.05312	0.07236	0.01927	-0.01440	0.23425	0.09392	0.41756	1.00000

V-E-2

TABLE V-E-2

Intercorrelations among the Key Analysis Variables -- Cohort 1, Spring, 1973 Reading Total Score Analysis

[r (p<.05) = .602 , k_{eff} = 11]

	RESR73	COMPSES	RESR72	SUM04	SUM10	E3NHIN	T3TQ	E3UO	E3IDM	E3TLDM	E3IIP	E3SC
RESR73	1.00000	0.27356	0.71921	-0.13698	-0.19385	-0.08805	0.20052	-0.16467	-0.14959	-0.07847	0.06745	-0.24491
COMPSES	0.27356	1.00000	0.40515	0.12957	0.13882	0.17492	0.16835	0.29901	0.04380	-0.19149	0.23623	-0.11480
RESR72	0.71921	0.40515	1.00000	0.09593	0.07385	0.08977	0.15478	0.15519	0.03467	-0.12635	0.12661	-0.09419
SUM04	-0.13698	0.12957	0.09593	1.00000	0.95748	-0.12968	0.02362	0.61334	0.80668	0.21742	0.21696	0.62684
SUM10	-0.19385	0.13882	0.07385	0.95748	1.00000	-0.05426	0.01891	0.75526	0.74672	0.17105	0.17776	0.70821
E3NHIN	-0.08805	0.17492	0.08977	-0.12968	-0.05426	1.00000	-0.06255	0.13691	-0.30093	0.21327	-0.15284	-0.28638
T3TQ	0.20052	0.16835	0.15478	0.02362	0.01891	-0.06255	1.00000	0.00305	-0.09147	0.09023	0.12070	-0.20940
E3UO	-0.16467	0.29901	0.15519	0.61334	0.75526	0.13691	0.00305	1.00000	0.38588	-0.35209	0.24048	0.48078
E3IDM	-0.14959	0.04380	0.03467	0.80668	0.74672	-0.30093	-0.09147	0.38588	1.00000	0.02344	0.11134	0.80023
E3TLDM	-0.07847	-0.19149	-0.12635	0.21742	0.17105	0.21327	0.09023	-0.35209	0.02344	1.00000	-0.36991	-0.00537
E3IIP	0.06745	0.23623	0.12661	0.21696	0.17776	-0.15284	0.12070	0.24048	0.11134	-0.36991	1.00000	-0.09032
E3SC	-0.24491	-0.11480	-0.09419	0.62684	0.70821	-0.28638	-0.20940	0.48078	0.80023	-0.00537	-0.09032	1.00000
E3UPA	-0.14037	-0.09568	-0.02182	0.86178	0.82043	-0.26402	-0.00760	0.43373	0.64323	0.38473	-0.07686	0.58064
E3CGO	-0.02257	-0.10642	0.00299	0.20105	0.24060	-0.61087	-0.21313	0.32587	0.37421	-0.56189	0.32687	0.52187
E3TUC	-0.13172	0.19120	0.10905	0.57298	0.66683	0.36515	0.16926	0.51994	0.29902	0.43234	-0.29396	0.28031
E3CIP	-0.07462	0.24163	0.05604	0.54954	0.53627	0.10633	0.19479	0.44071	0.20502	0.11210	0.64736	0.03281
E3USE	-0.07414	0.27584	0.16411	0.44263	0.48621	0.51906	0.06222	0.44283	0.14823	0.30850	-0.28679	0.12052
T3AGE	0.05723	-0.10352	-0.01654	-0.04161	0.00052	-0.21460	0.50078	-0.07979	-0.05575	0.21111	-0.30867	0.05416
T3TSB	-0.06488	0.03649	-0.03272	-0.00071	-0.01114	0.01219	-0.05243	0.08245	-0.07192	-0.18764	0.49229	-0.14678
PCT72	0.09195	0.09968	-0.00000	-0.61208	-0.54644	-0.15124	-0.07337	-0.02582	-0.52810	-0.73060	0.23663	-0.38531
PCT73	-0.00000	0.49570	0.22791	0.02762	0.09763	0.56895	0.28000	0.32548	-0.02353	-0.04786	-0.04034	-0.21821
RTOT72	0.72361	0.41067	0.99797	0.05680	0.03893	0.07997	0.14980	0.15324	0.00100	-0.17257	0.14141	-0.11851
RTOT73	0.98497	0.35508	0.74777	-0.13015	-0.17407	0.01156	0.24588	-0.10597	-0.15140	-0.08556	0.05947	-0.27892

	E3UPA	E3CGO	E3TUC	E3CIP	E3USE	T3AGE	T3TSB	PCT72	PCT73	RTOT72	RTOT73
RESR73	-0.14037	-0.02257	-0.13172	-0.07462	-0.07414	0.05723	-0.06488	0.09195	-0.00000	0.72361	0.98497
COMPSES	-0.09568	-0.10642	0.19120	0.24163	0.27584	-0.10352	0.03649	0.09968	0.49570	0.41067	0.35508
RESR72	-0.02182	0.00299	0.10905	0.05604	0.16411	-0.01654	-0.03272	-0.00000	0.22791	0.99797	0.74777
SUM04	0.86178	0.20105	0.57298	0.54954	0.44263	-0.04161	-0.00071	-0.61208	0.02762	0.05680	-0.13015
SUM10	0.82043	0.24060	0.66683	0.53627	0.48621	0.00052	-0.01114	-0.54644	0.09763	0.03893	-0.17407
E3NHIN	-0.26402	-0.61087	0.36515	0.10633	0.51903	-0.21460	0.01219	-0.15124	0.56895	0.07997	0.01156
T3TQ	-0.00760	-0.21313	0.16926	0.19479	0.06222	0.50078	-0.05243	-0.07337	0.28000	0.14980	0.24588
E3UO	0.43373	0.32587	0.51994	0.44071	0.44283	-0.07979	0.08245	-0.02582	0.32548	0.15324	-0.10597
E3IDM	0.64323	0.37421	0.29902	0.20502	0.14823	-0.05575	-0.07192	-0.52810	-0.02353	0.00100	-0.15140
E3TLDM	0.38473	-0.56189	0.43234	0.11210	0.30850	0.21111	-0.18764	-0.73060	-0.04786	-0.17257	-0.08556
E3IIP	-0.07686	0.32687	-0.29396	0.64736	-0.28679	-0.30867	0.49229	0.23663	-0.04034	0.14141	0.05947
E3SC	0.58064	0.52187	0.28031	0.03281	0.12052	0.05416	-0.14678	-0.38531	-0.21821	-0.11851	-0.27892
E3UPA	1.00000	0.15391	0.52292	0.35623	0.24559	0.14846	-0.09721	-0.67637	-0.22761	-0.06481	-0.17758
E3CGO	0.15391	1.00000	-0.29145	-0.18734	-0.36113	-0.03290	0.06702	0.26866	-0.50089	0.02007	-0.10876
E3TUC	0.52292	-0.29145	1.00000	0.20310	0.76417	0.18582	-0.23666	-0.54499	0.49117	0.07416	-0.04489
E3CIP	0.35623	-0.18734	0.20310	1.00000	0.18950	-0.20338	0.37778	-0.19034	0.21557	0.04382	-0.03626
E3USE	0.24559	-0.36113	0.76417	0.18950	1.00000	-0.02705	-0.22635	-0.33033	0.52955	0.14276	0.01846
T3AGE	0.14846	-0.03290	0.18582	-0.20338	-0.02705	1.00000	-0.13145	-0.05387	-0.09323	-0.01993	0.04026
T3TSB	-0.09721	0.06702	-0.23666	0.37778	-0.22635	-0.13145	1.00000	0.31679	-0.10111	-0.01250	-0.08137
PCT72	-0.67637	0.26866	-0.54499	-0.19034	-0.33033	-0.05387	0.31679	1.00000	-0.04404	0.06362	0.08296
PCT73	-0.22761	-0.50089	0.49117	0.21557	0.52955	-0.09323	-0.10111	-0.04404	1.00000	0.22464	0.17275
RTOT72	-0.06481	0.02007	0.07416	0.04382	0.14276	-0.01993	-0.01250	0.06362	0.22464	1.00000	0.75153
RTOT73	-0.17758	-0.10876	-0.04489	-0.03626	0.01846	0.04026	-0.08137	0.08296	0.17275	0.75153	1.00000

TABLE V-E-3

Intercorrelations among the Key Analysis Variables -- Cohort 4, Spring, 1972 Reading Total Score Analysis

[r $(p<.05)$ = .404 , k_{eff} = 24]

	RESR72	COMPSES	RESR71	SUM04	SUM10	E2MMIN	T2TQ	E2UO	E2IDM	E2TLDM	E2IIP	E2SC
RESR72	1.00000	0.37097	0.83833	0.04058	0.00913	0.04120	0.05205	0.04433	-0.03614	-0.02353	0.06498	-0.06633
COMPSES	0.37097	1.00000	0.34029	0.13997	0.20607	0.07734	-0.06156	0.29037	-0.00593	0.07361	0.25038	0.05556
RESR71	0.83833	0.34029	1.00000	0.04917	0.00505	0.00043	0.08354	0.02022	-0.01120	-0.03721	0.05574	-0.07569
SUM04	0.04058	0.13997	0.04917	1.00000	0.93937	0.09091	0.02418	0.70255	0.70022	0.59931	0.80747	0.47903
SUM10	0.00913	0.20607	0.00505	0.93937	1.00000	0.14756	-0.08366	0.82824	0.66632	0.66095	0.73480	0.61094
E2MMIN	0.04120	0.07734	0.00043	0.09091	0.14756	1.00000	-0.07559	0.30642	-0.12914	0.12738	0.27946	0.17138
T2TQ	0.05205	-0.06156	0.08354	0.02418	-0.08366	-0.07559	1.00000	-0.23418	0.09954	0.06420	0.01978	-0.27955
E2UO	0.04433	0.29037	0.02022	0.70255	0.82824	0.30642	-0.23418	1.00000	0.41171	0.43875	0.61672	0.50814
E2IDM	-0.03614	-0.00593	-0.01120	0.70022	0.66632	-0.12914	0.09954	0.41171	1.00000	0.51260	0.39894	0.45655
E2TLDM	-0.02353	0.07361	-0.03721	0.59931	0.66095	0.12738	0.06420	0.43875	0.51260	1.00000	0.39811	0.41285
E2IIP	0.06498	0.25038	0.05574	0.80747	0.73480	0.27946	0.01978	0.61672	0.39894	0.39811	1.00000	0.27019
E2SC	-0.06633	0.05556	-0.07569	0.47903	0.61094	0.17138	-0.27955	0.50814	0.45655	0.41285	0.27019	1.00000
E2UPA	0.01561	0.07061	0.04008	0.72809	0.63665	-0.20522	-0.08552	0.34356	0.39234	0.31419	0.43042	0.41398
E2CGO	-0.02607	0.00063	-0.02427	0.53656	0.62375	0.05564	-0.13754	0.48829	0.46534	0.32204	0.40544	0.30434
E2TUC	-0.03303	0.08195	-0.03194	0.50761	0.61959	-0.13704	-0.00579	0.37323	0.41733	0.29520	0.26919	0.23497
E2CIP	0.04150	0.31298	0.03854	0.61093	0.63033	0.13226	0.00410	0.61254	0.21184	0.35715	0.64721	0.28072
E2USE	0.05631	0.21497	0.04976	0.81340	0.82823	0.25952	0.06581	0.73373	0.51587	0.63135	0.57216	0.36297
T2AGE	0.04812	-0.03621	0.05723	-0.01706	-0.03693	0.04730	0.04644	-0.22317	-0.03064	-0.01124	0.02565	-0.22924
T2TSR	0.07174	0.21073	0.03748	0.04710	0.15509	0.07522	-0.45330	0.31340	-0.10280	0.16424	0.04250	0.19691
PCT71	0.02479	-0.04813	0.00002	-0.36328	-0.23619	0.01824	-0.03489	-0.05613	-0.40515	-0.17612	-0.14492	-0.30582
PCT72	-0.00000	-0.08215	-0.04498	-0.13666	-0.13134	0.23792	-0.18820	0.10596	-0.25839	-0.30726	0.03188	-0.15559
RTOT71	0.83869	0.33866	0.99953	0.03805	-0.00369	0.00099	0.08060	0.01349	-0.02357	-0.04258	0.05128	-0.08500
RTOT72	0.99996	0.37167	0.83869	0.04220	0.01027	0.03914	0.05458	0.04396	-0.03390	-0.02087	0.06470	-0.06497

	E2UPA	E2CGO	E2TUC	E2CIP	E2USE	T2AGE	T2TSR	PCT71	PCT72	RTOT71	RTOT72
RESR72	0.01561	-0.02607	-0.03303	0.04150	0.05631	0.04812	0.07174	0.02479	-0.00000	0.83869	0.99996
COMPSES	0.07061	0.00063	0.08195	0.31298	0.21497	-0.03621	0.21073	-0.04813	-0.08215	0.33866	0.37167
RESR71	0.04008	-0.02427	-0.03194	0.03854	0.04976	0.05723	0.03748	0.00002	-0.04498	0.99953	0.83869
SUM04	0.72809	0.53656	0.50761	0.61093	0.81340	-0.01706	0.04710	-0.36328	-0.13666	0.03805	0.04220
SUM10	0.63665	0.62375	0.61959	0.63033	0.82823	-0.03693	0.15509	-0.23619	-0.13134	-0.00369	0.01027
E2MMIN	-0.20522	0.05564	-0.13704	0.13226	0.25952	0.04730	0.07522	0.01824	0.23792	0.00099	0.03914
T2TQ	-0.08552	-0.13754	-0.00579	0.00410	0.06581	0.04644	-0.45330	-0.03489	-0.18820	0.08060	0.05458
E2UO	0.34356	0.48829	0.37323	0.61254	0.73373	-0.22317	0.31340	-0.05613	0.10596	0.01349	0.04396
E2IDM	0.39234	0.46534	0.41733	0.21184	0.51587	-0.03064	-0.10280	-0.40515	-0.25839	-0.02357	-0.03390
E2TLDM	0.31419	0.32204	0.29520	0.35715	0.63135	-0.01124	0.16424	-0.17612	-0.30726	-0.04258	-0.02087
E2IIP	0.43042	0.40544	0.26919	0.64721	0.57216	0.02565	0.04250	-0.14492	0.03188	0.05128	0.06470
E2SC	0.41398	0.30434	0.23497	0.28072	0.36297	-0.22924	0.19691	-0.30582	-0.15559	-0.08500	-0.06497
E2UPA	1.00000	0.41210	0.34836	0.36793	0.36815	0.00140	0.02994	-0.43123	-0.33600	0.02535	0.01852
E2CGO	0.41210	1.00000	0.43769	-0.01487	0.33446	0.00703	-0.00044	-0.16138	-0.02259	-0.02919	-0.02587
E2TUC	0.34836	0.43769	1.00000	0.28343	0.53343	-0.02373	0.04532	-0.09232	-0.06930	-0.03475	-0.03248
E2CIP	0.36793	-0.01487	0.28343	1.00000	0.55994	-0.01008	0.15405	-0.14580	0.00155	0.03406	0.04148
E2USE	0.36815	0.33446	0.53343	0.55994	1.00000	-0.05446	0.12723	-0.13331	-0.05516	0.04566	0.05729
T2AGE	0.00140	0.00703	-0.02373	-0.01008	-0.05446	1.00000	-0.42283	-0.04007	0.04521	0.05593	0.04773
T2TSR	0.02994	-0.00044	0.04532	0.15405	0.12723	-0.42283	1.00000	0.12418	0.01769	0.04125	0.07158
PCT71	-0.43123	-0.16138	-0.09232	-0.14580	-0.13331	-0.04007	0.12418	1.00000	0.71225	0.03058	0.01862
PCT72	-0.33600	-0.02259	-0.06930	0.00155	-0.05516	0.04521	0.01769	0.71225	1.00000	-0.02319	-0.00867
RTOT71	0.02535	-0.02919	-0.03475	0.03406	0.04566	0.05593	0.04125	0.03058	-0.02319	1.00000	0.83886
RTOT72	0.01852	-0.02587	-0.03248	0.04148	0.05729	0.04773	0.07158	0.01862	-0.00867	0.83886	1.00000

TABLE V-E-4

Intercorrelations among the Key Analysis Variables -- Cohort 4, Spring, 1973 Reading Total Score Analysis

[r (p <.05) = .404 , k_{eff} = 24]

	RESR73	COMPSES	RESR72	SUM04	SUM10	E3NMIN	T3TQ	E3UO	E3IDM	E3TLDM	E3IIP	E3SC
RESR73	1.00000	0.38972	0.85374	-0.04294	-0.10719	-0.03902	-0.00954	-0.00160	-0.04083	-0.09606	-0.08071	-0.11558
COMPSES	0.38972	1.00000	0.37526	-0.05776	-0.08543	-0.09807	-0.06584	0.16238	-0.07904	-0.16870	-0.07695	-0.11369
RESR72	0.85374	0.37526	1.00000	-0.10955	-0.16169	-0.04639	-0.00120	-0.03039	-0.07560	-0.12332	-0.10286	-0.14622
SUM04	-0.04294	-0.05776	-0.10955	1.00000	0.89415	-0.11570	-0.11113	0.60162	0.47530	0.30694	0.73977	0.45002
SUM10	-0.10719	-0.08543	-0.16169	0.89415	1.00000	-0.22351	-0.10713	0.74967	0.43146	0.47546	0.79058	0.62857
E3NMIN	-0.03902	-0.09807	-0.04639	-0.11570	-0.22351	1.00000	0.02560	-0.30027	-0.16758	-0.17990	-0.05389	-0.29997
T3TQ	-0.00954	-0.06584	-0.00120	-0.11113	-0.10719	0.02560	1.00000	-0.04992	-0.18477	0.18798	0.07668	-0.31761
E3UO	-0.00160	0.16238	-0.03039	0.60162	0.74967	-0.30027	-0.04992	1.00000	0.16891	0.18791	0.58145	0.33894
E3IDM	-0.04083	-0.07904	-0.07560	0.47530	0.43146	-0.16758	-0.13477	0.16891	1.00000	-0.01579	0.16030	0.55663
E3TLDM	-0.09606	-0.16870	-0.12332	0.30694	0.47546	-0.17990	0.18798	0.18791	-0.01579	1.00000	0.46860	0.22459
E3IIP	-0.08071	-0.07695	-0.10286	0.73977	0.79053	-0.05389	0.07668	0.58145	0.16080	0.46860	1.00000	0.23926
E3SC	-0.11558	-0.11369	-0.14622	0.45002	0.62857	-0.29997	-0.31761	0.33894	0.55663	0.22459	0.23926	1.00000
E3UPA	0.05607	0.08769	-0.00279	0.73481	0.50112	-0.11496	-0.26365	0.27529	0.32608	-0.02883	0.23680	0.24886
E3CGO	-0.15962	-0.22734	-0.18401	0.54427	0.56844	0.22389	-0.16490	0.28633	0.47175	-0.00148	0.42316	0.46334
E3TUC	-0.09794	-0.01422	-0.11345	0.21263	0.49780	-0.42124	-0.05581	0.47944	-0.04998	0.27101	0.29493	0.34116
E3CIP	-0.05253	-0.03205	-0.06554	0.54660	0.60750	0.03993	0.10025	0.42300	0.13626	0.39957	0.76564	0.11229
E3USE	-0.07704	-0.14294	-0.13330	0.58335	0.58446	0.02368	0.11943	0.52167	-0.07494	0.38262	0.46620	0.22578
T3AGE	0.00136	-0.11815	0.02656	-0.09085	-0.00352	-0.02412	0.60734	0.07970	-0.27821	0.16156	0.13521	-0.25413
T3TSB	0.16383	0.33080	0.15782	-0.05323	-0.00277	-0.13553	-0.14380	0.12592	0.00301	0.17214	0.01183	0.00243
PCT72	-0.11126	-0.08673	-0.00002	-0.22199	-0.11716	0.03518	0.11643	0.06421	-0.11332	-0.12950	0.08669	-0.25355
PCT73	0.00001	0.18026	0.04058	-0.07397	0.00793	-0.15768	0.04466	0.20736	-0.02548	-0.16144	0.07795	-0.16376
RTOT72	0.85657	0.37759	0.99959	-0.10315	-0.15828	-0.04788	-0.00454	-0.03221	-0.07233	-0.12006	-0.10529	-0.13891
RTOT73	0.99993	0.39132	0.85416	-0.04337	-0.10709	-0.04087	-0.00902	0.00084	-0.04113	-0.09795	-0.07978	-0.11750

	E3UPA	E3CGO	E3TUC	E3CIP	E3USE	T3AGE	T3TSB	PCT72	PCT73	RTOT72	RTOT73
RESR73	0.05607	-0.15962	-0.09794	-0.05253	-0.07704	0.00136	0.16383	-0.11126	0.00001	0.85657	0.99993
COMPSES	0.08769	-0.22734	-0.01422	-0.03205	-0.14294	-0.11815	0.33080	-0.08673	0.18026	0.37759	0.39182
RESR72	-0.00279	-0.18401	-0.11345	-0.06554	-0.13330	0.02656	0.15782	-0.00002	0.04058	0.99959	0.85416
SUM04	0.73481	0.54427	0.21263	0.54660	0.58335	-0.09085	-0.05323	-0.22199	-0.07897	-0.10315	-0.04387
SUM10	0.50112	0.56844	0.49780	0.60750	0.58446	-0.00352	-0.00277	-0.11716	0.00793	-0.15828	-0.10709
E3NMIN	-0.11496	0.22889	-0.42124	0.03993	0.02868	-0.02412	-0.13553	0.03518	-0.15768	-0.04788	-0.04087
T3TQ	-0.26365	-0.16490	-0.05581	0.10025	0.11943	0.60734	-0.14330	0.11648	0.04466	-0.00454	-0.00902
E3UO	0.27529	0.28633	0.47944	0.42300	0.52167	0.07970	0.12592	0.06421	0.20736	-0.03221	0.00084
E3IDM	0.32608	0.47175	-0.04998	0.18626	-0.07494	-0.27821	0.00301	-0.11332	-0.02548	-0.07233	-0.04113
E3TLDM	-0.02883	-0.00148	0.27101	0.39957	0.38262	0.16156	0.17214	-0.12950	-0.16144	-0.12006	-0.09795
E3IIP	0.23630	0.42316	0.29493	0.76564	0.46620	0.13521	0.01183	0.08669	0.07795	-0.10529	-0.07978
E3SC	0.24836	0.46339	0.34116	0.11229	0.22578	-0.25413	0.00243	-0.25355	-0.16376	-0.13891	-0.11750
E3UPA	1.00000	0.36426	-0.01548	0.18445	0.15113	-0.18327	-0.13772	-0.30704	-0.03645	0.00600	0.05505
E3CGO	0.36426	1.00000	-0.01954	0.17344	0.17070	-0.07096	-0.23731	0.06111	-0.12381	-0.18568	-0.16107
E3TUC	-0.01548	-0.01954	1.00000	0.17543	0.32833	0.16898	0.04362	0.00030	0.25047	-0.11843	-0.09498
E3CIP	0.18445	0.17344	0.17543	1.00000	0.24075	0.12387	0.00400	0.14470	0.21194	-0.06966	-0.05004
E3USE	0.15113	0.17070	0.32833	0.24075	1.00000	0.00127	0.02806	-0.22344	-0.13847	-0.12668	-0.07925
T3AGE	-0.18327	-0.07096	0.16898	0.12387	0.00127	1.00000	-0.19668	0.33581	0.18507	0.01694	0.00353
T3TSB	-0.13772	-0.23731	0.04362	0.00400	0.02806	-0.19668	1.00000	-0.04471	0.07832	0.15903	0.16474
PCT72	-0.30704	0.06111	0.00030	0.14470	-0.22944	0.33581	-0.04471	1.00000	0.69124	-0.02863	-0.10312
PCT73	-0.03645	-0.12381	0.25047	0.21194	-0.13847	0.18507	0.07832	0.69124	1.00000	0.02079	0.01178
RTOT72	0.00600	-0.18568	-0.11843	-0.06966	-0.12668	0.01694	0.15903	-0.02863	0.02079	1.00000	0.85676
RTOT73	0.05505	-0.16107	-0.09498	-0.05004	-0.07925	0.00353	0.16474	-0.10312	0.01178	0.85676	1.00000

TABLE V-E-5

Intercorrelations among the Key Analysis Variables -- Cohort 6, Spring, 1972 Reading Total Score Analysis

[r ($p<.05$) = .707 , $k_{eff} = 8$]

	RESR72	COMPSES	RESR71	SUM04	SUM10	E2NMIN	T2TQ	E2UO	E2IDM	E2TLDM	E2IIP	E2SC
RESR72	1.00000	0.33736	0.85880	0.15013	0.15832	-0.11786	-0.15802	0.13341	0.07829	0.10696	0.08922	0.17390
COMPSES	0.33736	1.00000	0.32001	0.17212	0.19001	-0.27150	-0.24160	0.19283	0.09129	0.00401	0.03082	0.34980
RESR71	0.85880	0.32001	1.00000	0.13201	0.13827	-0.17376	-0.17455	0.10855	0.05682	0.10312	0.04241	0.18554
SUM04	0.15013	0.17212	0.13201	1.00000	0.97611	0.16316	-0.06409	0.84057	0.56971	0.77325	0.85220	0.65579
SUM10	0.15832	0.19001	0.13827	0.97611	1.00000	0.14242	-0.08318	0.90396	0.55772	0.83634	0.82030	0.75640
E2NMIN	-0.11786	-0.27150	-0.17376	0.16316	0.14242	1.00000	0.42880	0.08185	0.42367	0.12978	0.35917	-0.10257
T2TQ	-0.15802	-0.24160	-0.17455	-0.06409	-0.08318	0.42880	1.00000	-0.03209	0.04628	0.01943	-0.04439	-0.16668
E2UO	0.13341	0.19283	0.10855	0.84057	0.90396	0.08185	-0.03209	1.00000	0.44977	0.72400	0.66134	0.74929
E2IDM	0.07829	0.09129	0.05682	0.56971	0.55772	0.42367	0.04628	0.44977	1.00000	0.45109	0.31447	0.42899
E2TLDM	0.10696	0.00401	0.10312	0.77325	0.83634	0.12978	0.01943	0.72400	0.45109	1.00000	0.63312	0.58760
E2IIP	0.08922	0.03082	0.04241	0.85220	0.82030	0.35917	-0.04439	0.66134	0.31447	0.63312	1.00000	0.33999
E2SC	0.17390	0.34980	0.18554	0.65579	0.75640	-0.10257	-0.16668	0.74929	0.42899	0.58760	0.33999	1.00000
E2UPA	0.12185	0.12276	0.16633	0.61257	0.52762	-0.36637	-0.03787	0.40421	0.20087	0.53264	0.29466	0.32993
E2CGO	0.20472	0.32744	0.21751	0.35018	0.44120	-0.65288	-0.44683	0.36022	-0.06482	0.44458	0.22645	0.52975
E2TUC	0.00853	-0.14165	-0.05011	0.65101	0.57894	0.60754	0.09213	0.36824	0.42803	0.47850	0.87853	-0.01329
E2CIP	0.11568	0.14893	0.08320	0.95094	0.93858	0.36659	0.01025	0.86786	0.62987	0.67042	0.84268	0.65336
E2USE	0.15083	0.26150	0.12439	0.88634	0.93700	0.17821	-0.10304	0.90971	0.53054	0.65727	0.73580	0.84861
T2AGE	-0.10563	-0.08137	-0.10316	-0.11297	-0.08427	0.10675	0.77016	-0.00404	0.03526	-0.00258	-0.17720	0.01712
T2TSB	0.07795	0.16272	0.09925	-0.30727	-0.21827	-0.39024	-0.31750	-0.22283	-0.44235	-0.03337	-0.27314	0.04583
PCT71	0.00168	0.08787	0.00182	0.46617	0.53461	0.20812	0.03700	0.54871	0.22855	0.33441	0.33945	0.71658
PCT72	0.00275	0.00385	0.00307	0.46687	0.48031	0.57794	0.14963	0.28705	0.54908	0.39820	0.35882	0.56429
RTOT71	0.85771	0.31522	0.99874	0.10844	0.11125	-0.18401	-0.17621	0.08086	0.04528	0.08620	0.02531	0.14932
RTOT72	0.99968	0.33718	0.85850	0.13821	0.14605	-0.13255	-0.16179	0.12607	0.06430	0.09679	0.08006	0.15949

	E2UPA	E2CGO	E2TUC	E2CIP	E2USE	T2AGE	T2TSB	PCT71	PCT72	RTOT71	RTOT72
RESR72	0.12185	0.20472	0.00853	0.11568	0.15083	-0.10563	0.07795	0.00168	0.00275	0.85771	0.99968
COMPSES	0.12276	0.32744	-0.14165	0.14893	0.26150	-0.08137	0.16272	0.08787	0.00385	0.31522	0.33718
RESR71	0.16633	0.21751	-0.05011	0.08320	0.12439	-0.10316	0.09925	0.00182	0.00307	0.99874	0.85850
SUM04	0.61257	0.35018	0.65101	0.95094	0.88634	-0.11297	-0.30727	0.46617	0.46687	0.10844	0.13821
SUM10	0.52762	0.44120	0.57894	0.93858	0.93700	-0.08427	-0.21827	0.53461	0.48031	0.11125	0.14605
E2NMIN	-0.36637	-0.65288	0.60754	0.36659	0.17821	0.10675	-0.39024	0.20812	0.57794	-0.18401	-0.13255
T2TQ	-0.03787	-0.44683	0.09218	0.01025	-0.10304	0.77016	-0.31750	0.03700	0.14963	-0.17621	-0.16179
E2UO	0.40421	0.36022	0.36824	0.86786	0.90971	-0.00404	-0.22283	0.54871	0.28705	0.08086	0.12607
E2IDM	0.20087	-0.06482	0.42803	0.62987	0.53054	0.03526	-0.44235	0.22855	0.54908	0.04528	0.06430
E2TLDM	0.53264	0.44458	0.47850	0.67042	0.65727	-0.00258	-0.03337	0.33441	0.39820	0.08620	0.09679
E2IIP	0.29466	0.22645	0.87853	0.84268	0.73580	-0.17720	-0.27314	0.33945	0.35882	0.02531	0.08006
E2SC	0.32993	0.52975	-0.01329	0.65336	0.84861	0.01712	0.04583	0.71658	0.56429	0.14932	0.15949
E2UPA	1.00000	0.34467	0.11886	0.40023	0.30491	-0.06117	-0.10661	0.03400	0.03814	0.16443	0.12085
E2CGO	0.34467	1.00000	-0.08175	0.14623	0.38340	-0.15830	0.43543	0.09608	-0.15545	0.21243	0.20862
E2TUC	0.11886	-0.08175	1.00000	0.67094	0.45573	-0.15233	-0.40905	0.11293	0.34250	-0.05573	-0.00019
E2CIP	0.40023	0.14623	0.67094	1.00000	0.92924	-0.06913	-0.40762	0.56743	0.56090	0.05461	0.10138
E2USE	0.30491	0.38340	0.45573	0.92924	1.00000	-0.06384	-0.21975	0.70520	0.55012	0.08882	0.13679
T2AGE	-0.06117	-0.15830	-0.15233	-0.06913	-0.06384	1.00000	-0.05118	0.03522	0.05583	-0.10481	-0.10703
T2TSB	-0.10661	0.43543	-0.40905	-0.40762	-0.21975	-0.05118	1.00000	-0.28862	-0.27273	0.11363	0.08487
PCT71	0.03400	0.09608	0.11293	0.56743	0.70520	0.03522	-0.28862	1.00000	0.71731	-0.04841	-0.01658
PCT72	0.03814	-0.15545	0.34250	0.56090	0.55012	0.05533	-0.27273	0.71731	1.00000	-0.03296	-0.02271
RTOT71	0.16443	0.21243	-0.05573	0.05461	0.08882	-0.10401	0.11363	-0.04841	-0.03296	1.00000	0.85833
RTOT72	0.12085	0.20862	-0.00019	0.10138	0.13679	-0.10703	0.08487	-0.01658	-0.02271	0.85833	1.00000

TABLE V-E-6

Intercorrelations among the Key Analysis Variables -- Cohort 6, Spring, 1973 Reading Total Score Analysis

$[\ r\ (p<.05) = .754\ ,\ k_{eff} = 7\ ]$

	RESR73	COMPSES	RESR72	SUM04	SUM10	E3MHIN	T3TQ	E3UO	E3IDM	E3TLDM	E3IIP	E3SC
RESR73	1.00000	0.34352	0.36052	0.04290	0.03542	-0.21044	-0.13024	0.07508	0.02750	-0.07852	-0.06430	0.13565
COMPSES	0.34352	1.00000	0.35639	0.29373	0.25265	-0.33377	-0.23405	0.29275	0.13984	-0.06097	0.03993	0.36802
RESR72	0.36052	0.35639	1.00000	0.12143	0.10796	-0.17041	-0.14871	0.13402	0.09223	-0.02454	0.00324	0.15819
SUM04	0.04290	0.29373	0.12143	1.00000	0.96170	0.02415	-0.17816	0.91104	0.70722	0.44810	0.84922	0.73840
SUM10	0.03542	0.25265	0.10796	0.96170	1.00000	-0.02093	-0.05960	0.96283	0.68691	0.60750	0.84106	0.78465
E3MHIN	-0.21044	-0.33377	-0.17041	0.02415	-0.02093	1.00000	0.25843	-0.15043	0.23799	0.06874	0.32276	-0.51082
T3TQ	-0.13024	-0.23405	-0.14871	-0.17816	-0.05960	0.25843	1.00000	-0.10645	0.21112	0.16153	-0.06809	-0.25402
E3UO	0.07508	0.29275	0.13402	0.91104	0.96283	-0.15043	-0.10645	1.00000	0.62517	0.54031	0.76289	0.85380
E3IDM	0.02750	0.13984	0.09223	0.70722	0.68691	0.23799	0.21112	0.62517	1.00000	0.27163	0.53390	0.37198
E3TLDM	-0.07852	-0.06097	-0.02454	0.44810	0.60750	0.06874	0.16153	0.54031	0.27163	1.00000	0.53498	0.35976
E3IIP	-0.06430	0.03993	0.00324	0.84922	0.84106	0.32276	-0.06809	0.76289	0.53390	0.53498	1.00000	0.56035
E3SC	0.13565	0.36802	0.15819	0.73840	0.78465	-0.51082	-0.25402	0.85380	0.37198	0.35976	0.56035	1.00000
E3UPA	0.09693	0.36926	0.14850	0.53327	0.51199	-0.30299	-0.19345	0.44662	0.27184	0.13224	0.24671	0.32278
E3CGO	0.04769	0.02797	0.01936	-0.05195	0.12468	-0.26197	0.49153	0.07482	0.19694	0.21410	-0.11192	0.13445
E3TUC	-0.04049	0.07284	0.02997	0.76419	0.79116	0.41428	0.14085	0.72390	0.69946	0.32028	0.73041	0.39339
E3CIP	-0.01972	0.16041	0.06642	0.89622	0.93053	0.10416	-0.05946	0.86019	0.58841	0.75391	0.84277	0.59886
E3USE	0.05483	0.24001	0.10893	0.82085	0.81237	-0.02871	-0.26654	0.84592	0.56626	0.37679	0.72185	0.82846
T3AGE	-0.14966	-0.20380	-0.15735	-0.03201	0.02724	0.20625	0.61955	0.00000	0.08191	0.22061	0.13325	-0.04664
T3TSD	0.07014	0.07583	0.06043	0.06146	0.11431	-0.19015	-0.21336	0.16315	0.17339	0.08247	0.06416	0.26676
PCT72	-0.09322	-0.00552	-0.00364	0.62394	0.68017	0.31439	0.00836	0.55341	0.50019	0.81554	0.62800	0.31603
PCT73	0.00700	0.24814	0.10288	0.38016	0.82262	0.21559	-0.16786	0.72611	0.69444	0.31791	0.70601	0.45250
RTOT72	0.86150	0.35641	0.99993	0.11431	0.10016	-0.17400	-0.14879	0.12766	0.08654	-0.03389	-0.00396	0.15455
RTOT73	0.99014	0.37456	0.86560	0.16574	0.15028	-0.17795	-0.15234	0.17599	0.12449	-0.03313	0.03481	0.19757

	E3UPA	E3CGO	E3TUC	E3CIP	E3USE	T3AGE	T3TSD	PCT72	PCT73	RTOT72	RTOT73
RESR73	0.09693	0.04769	-0.04049	-0.01972	0.05483	-0.14966	0.07014	-0.09322	0.00700	0.86150	0.99014
COMPSES	0.36926	0.02797	0.07254	0.16041	0.24001	-0.20380	0.07583	-0.00552	0.24814	0.35641	0.37456
RESR72	0.14850	0.01936	0.02997	0.06642	0.10393	-0.15735	0.06043	-0.00364	0.10288	0.99993	0.86560
SUM04	0.53327	-0.05195	0.76419	0.89622	0.82085	-0.03201	0.06146	0.62394	0.38016	0.11431	0.16574
SUM10	0.51199	0.12468	0.79116	0.93053	0.81237	0.02724	0.11481	0.68017	0.82262	0.10016	0.15028
E3MHIN	-0.30299	-0.26197	0.41428	0.10416	-0.02871	0.20625	-0.19015	0.31439	0.21559	-0.17400	-0.17795
T3TQ	-0.19345	0.49153	0.14085	-0.05946	-0.26654	0.61955	-0.21336	0.00836	-0.16786	-0.14879	-0.15234
E3UO	0.44662	0.07482	0.72390	0.86019	0.84592	0.00000	0.16315	0.55341	0.72611	0.12766	0.17599
E3IDM	0.27184	0.19694	0.69946	0.58841	0.56626	0.08191	0.17339	0.50019	0.69444	0.08654	0.12449
E3TLDM	0.13224	0.21410	0.32028	0.75391	0.37679	0.22061	0.08247	0.81554	0.31791	-0.03389	-0.03313
E3IIP	0.24671	-0.11192	0.73041	0.84277	0.72185	0.13325	0.06416	0.62800	0.70601	-0.00396	0.03481
E3SC	0.32278	0.13445	0.39339	0.59886	0.82846	-0.04664	0.26676	0.31603	0.45250	0.15455	0.19757
E3UPA	1.00000	0.07305	0.34232	0.53014	0.12089	-0.23072	-0.18404	0.19791	0.61769	0.14622	0.18247
E3CGO	0.07305	1.00000	0.11240	-0.02412	-0.17921	0.12764	0.26930	0.02282	-0.06001	0.01960	0.03877
E3TUC	0.34232	0.11240	1.00000	0.70492	0.59036	0.04225	-0.03817	0.53300	0.83439	0.02386	0.07685
E3CIP	0.53014	-0.02412	0.70492	1.00000	0.67698	0.04982	0.00701	0.78248	0.79383	0.05744	0.09171
E3USE	0.12089	-0.17921	0.59036	0.67698	1.00000	-0.00504	0.19653	0.56137	0.62390	0.10253	0.14235
T3AGE	-0.23072	0.12764	0.04225	0.04982	-0.00504	1.00000	0.07667	0.09765	-0.14206	-0.15845	-0.16794
T3TSD	-0.18404	0.26930	-0.03817	0.00701	0.19653	0.07667	1.00000	-0.00624	-0.00124	0.06054	0.06080
PCT72	0.19791	0.02282	0.53300	0.78248	0.56137	0.09765	-0.00624	1.00000	0.65594	-0.01511	-0.00032
PCT73	0.61769	-0.06001	0.83439	0.79383	0.62390	-0.14206	-0.00124	0.65594	1.00000	0.09535	0.14702
RTOT72	0.14622	0.01960	0.02386	0.05744	0.10253	-0.15845	0.06054	-0.01511	0.09535	1.00000	0.86551
RTOT73	0.18247	0.03877	0.07685	0.09171	0.14235	-0.16794	0.06080	-0.00032	0.14702	0.86551	1.00000

APPENDIX V-F

Instructions for Reading Commonality Analysis Tables

INSTRUCTIONS FOR READING COMMONALITY ANALYSIS TABLES

A technically oriented discussion of commonality analysis and its use with multilevel predictor variables such as those analyzed by Project LONGSTEP may be found in Appendix IV-E. The paragraphs which follow provide an overview of how the commonality analysis tables presented in the report and in its associated appendices may be read.

The table on the following page is a copy of one of the tables contained in the report and will be used here for discussion purposes. In brief, (1) each column in a commonality table shows the first-order commonality coefficients or uniquenesses [$U(X_i)$] and the higher-order commonality coefficients [e.g., C(S,P)] for the predictor variable noted at the top of the column, (2) the uniquenesses may be interpreted as the proportion of posttest variance that can be attributed to a predictor variable (noted at the top of each column), after that predictor variable has been residualized on the basis of all the other predictors in the analysis, and (3) the commonality coefficients in each column provide a relative index of the predictive overlap of the predictors shown along the left margin. Thus, C(S,P), the second-order commonality coefficient for SES and pretest, measures the predictive overlap of SES and pretest. On the other hand, the third-order commonality coefficient, C(S,P,E), indexes the amount of overlap of SES, pretest and the EdExAG variable set composed of Level of Innovation and Number of Minutes per Day.

Uniquenesses usually vary from predictor set to predictor set. The higher-order commonality coefficients, however, can be associated with all of the variables whose predictive overlap is indexed by a given coefficient [e.g., the value for the C(S,P) coefficient is in both the SES column and the Pretest column]. Coefficients have been repeated in more than one column so that the uniquenesses and commonalities for a given predictor in this model can be examined by looking down a column.

Normalized coefficients, that is, each coefficient divided by the total multiple correlation, are also shown in these tables (below each coefficient and in parentheses). Because this procedure expresses each coefficient in terms of the overall predictability of the model [i.e., the

Commonality Coefficients* for the Level of Innovation Growth Model -- Cohort 1, Spring 1972, Reading Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables LI and NMIN(E)**	Teaching Qualifications(T)
$U(X_1)$	.11356 (.43409)	.09510 (.36354)	.00423 (.01616)	.00213 (.00814)
C(S,P)	.04454 (.17027)	.04454 (.17027)		
C(S,E)	.00978 (.03737)		.00978 (.03737)	
C(S,T)	-.00213 (-.00814)			-.00213 (-.00814)
C(P,E)		-.00356 (-.01362)	-.00356 (-.01362)	
C(P,T)		-.00051 (-.00197)		-.00051 (-.00197)
C(E,T)			-.00022 (-.00083)	-.00022 (-.00083)
C(S,P,E)	-.00243 (-.00928)	-.00243 (-.00928)	-.00243 (-.00928)	
C(S,P,T)	.00077 (.00293)	.00077 (.00293)		.00077 (.00293)
C(S,E,T)	.00024 (.00094)		.00024 (.00094)	.00024 (.00094)
C(P,E,T)		.00014 (.00055)	.00014 (.00055)	.00014 (.00055)
C(S,P,E,T	-.00004 (-.00016)	-.00004 (-.00016)	-.00004 (-.00016)	-.00004 (-.00016)
$R^2(X_1)$	.16429	.13400	.00814	.00038

$R^2(S,P,E,T) = .26159$

$R^2(S,P,D,T)^+ = .32731$

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*Below each commonality coefficient and in parentheses is the normalized coefficient; that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**LI and NMIN are abbreviations for Level of Innovation and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

total proportion of posttest variance explained or $R^2(S,P,E,T)$], normalized coefficients sum to 1.0 and permit commonality coefficients from different analyses to be compared with respect to their relative associations in their own analyses.

APPENDIX V-G

Commonality Analysis Tables for the Degree of Individualization Growth Model-- Reading Total Score Analyses

TABLE V-G-1

Commonality Coefficients* for the Degree of Individualization Growth Model -- Cohort 1, Spring 1972, Reading Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAg Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.11637 (.44672)	.09426 (.36182)	.00314 (.01207)	.00256 (.00984)
C(S,P)	.04361 (.16739)	.04361 (.16739(		
C(S,E)	.00696 (.02671)		.00696 (.02671)	
C(S,T)	-.00250 (-.00960)			-.00250 (-.00960)
C(P,E)		-.00272 (-.01046)	-.00272 (-.01046)	
C(P,T)		-.00084 (-.00322)		-.00084 (-.00322)
C(E,T)			-.00065 (-.00249)	-.00065 (-.00249)
C(S,P,E)	-.00149 (-.00573)	-.00149 (-.00573)	-.00149 (-.00573)	
C(S,P,T)	.00091 (.00350)	.00091 (.00350)		.00091 (.00350)
C(S,E,T)	.00062 (.00236)		.00062 (.00236)	.00062 (.00236)
C(P,E,T)		.00047 (.00179)	.00047 (.00179)	.00047 (.00179)
C(S,P,E,T)	-.00019 (-.00072)	-.00019 (-.00072)	-.00019 (-.00072)	-.00019 (-.00072)
$R^2(X_i)$	.16429	.13400	.00613	.00038

$R^2(S,P,E,T) = .26051$

$R^2(S,P,D,T)^{+} = .32731$

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* Below each commonality coefficient and in parentheses is the normalized coefficient; that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-G-2

Commonality Coefficients* for the Degree of Individualization Growth Model--Cohort 1, Spring 1973, Reading Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAg Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.00051 (.00084)	.44742 (.74504)	.07419 (.12354)	.00555 (.00925)
C(S,P)	.08334 (.13878)	.08334 (.13878)		
C(S,E)	.00041 (.00068)		.00041 (.00068)	
C(S,T)	.00056 (.00093)			.00056 (.00093)
C(P,E)		-.02047 (-.03409)	-.02047 (-.03409)	
C(P,T)		.01452 (.02418)		.01452 (.02418)
C(E,T)			.00313 (.00522)	.00313 (.00522)
C(S,P,E)	-.02507 (-.04175)	-.02507 (-.04175)	-.02507 (-.04175)	
C(S,P,T)	.01848 (.03078)	.01848 (.03078)		.01848 (.03078)
C(S,E,T)	-.00109 (-.00182)		-.00109 (-.00182)	-.00109 (-.00182)
C(P,E,T)		.00135 (.00225)	.00135 (.00225)	.00135 (.00225)
C(S,P,E,T)	-.00229 (-.00382)	-.00229 (-.00382)	-.00229 (-.00382)	-.00229 (-.00382)
$R^2(X_i)$	.07484	.51727	.03015	.04021

$R^2(S,P,E,T) = .60052$

$R^2(S,P,D,T)^+ = .66135$

* Below each commonality coefficient and in parentheses is the normalized coefficient; that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-G-3

Commonality Coefficients* for the Degree of Individualization Growth Model-- Cohort 4, Spring 1972, Reading Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.00799 (.01121)	.56774 (.79665)	.00149 (.00210)	.00003 (.00004)
C(S,P)	.13083 (.18358)	.13083 (.18358)		
C(S,E)	.00010 (.00013)		.00010 (.00013)	
C(S,T)	.00017 (.00024)			.00017 (.00024)
C(P,E)		.00004 (.00006)	.00004 (.00006)	
C(P,T)		.00612 (.00859)		.00612 (.00859)
C(E,T)			.00004 (.00006)	.00004 (.00006)
C(S,P,E)	.00167 (.00234)	.00167 (.00234)	.00167 (.00234)	
C(S,P,T)	-.00328 (-.00461)	-.00328 (-.00461)		-.00328 (-.00461)
C(S,E,T)	.00006 (.00008)		.00006 (.00008)	.00006 (.00008)
C(P,E,T)		-.00043 (-.00060)	-.00043 (-.00060)	-.00043 (-.00060)
C(S,P,E,T)	.00010 (.00014)	.00010 (.00014)	.00010 (.00014)	.00010 (.00014)
$R^2(X_i)$	.13762	.70279	.00307	.00280

$R^2(S,P,E,T) = .71266$

$R^2(S,P,D,T)^+ = .73216$

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*Below each commonality coefficient and in parentheses is the normalized coefficient; that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-C-4

Commonality Coefficients* for the Degree of Individualization Growth Model--
Cohort 4, Spring 1973, Reading Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.00588 (.00798)	.58490 (.79318)	.00293 (.00397)	.00001 (.00001)
C(S,P)	.14263 (.19342)	.14263 (.19342)		
C(S,E)	-.00035 (-.00047)		-.00035 (-.00047)	
C(S,T)	.00000 (.00000)			.00000 (.00000)
C(P,E)		-.00256 (-.00348)	-.00256 (-.00348)	
C(P,T)		.00019 (.00025)		.00019 (.00025)
C(E,T)			.00000 (.00000)	.00000 (.00000)
C(S,P,E)	.00389 (.00528)	.00389 (.00528)	.00389 (.00528)	
C(S,P,T)	-.00000 (-.00000)	-.00000 (-.00000)		-.00000 (-.00000)
C(S,E,T)	.00006 (.00008)		.00006 (.00008)	.00006 (.00008)
C(P,E,T)		.00006 (.00009)	.00006 (.00009)	.00006 (.00009)
C(S,P,E,T)	-.00023 (-.00031)	-.00023 (-.00031)	-.00023 (-.00031)	-.00023 (-.00031)
$R^2(X_i)$	.15188	.72887	.00380	.00009

$R^2(S,P,E,T) = .73740$

$R^2(S,P,D,T)^+ = .75912$

*Below each commonality coefficient and in parentheses is the normalized coefficient; that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-G-5

Commonality Coefficients* for the Degree of Individualization Growth Model--Cohort 6, Spring 1972, Reading Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_1)$	.00479 (.00643)	.61589 (.82702)	.00279 (.00375)	.00016 (.00022)
C(S,P)	.07180 (.09641)	.07180 (.09641)		
C(S,E)	-.00047 (-.00063)		-.00047 (-.00063)	
C(S,T)	.00021 (.00028)			.00021 (.00028)
C(P,E)		.00600 (.00806)	.00600 (.00806)	
C(P,T)		.00369 (.00496)		.00369 (.00496)
C(E,T)			-.00014 (-.00018)	-.00014 (-.00018)
C(S,P,E)	.01895 (.02544)	.01895 (.02544)	.01895 (.02544)	
C(S,P,T)	.00481 (.00646)	.00481 (.00646)		.00481 (.00646)
C(S,E,T)	-.00017 (-.00023)		-.00017 (-.00023)	-.00017 (-.00023)
C(P,E,T)		.00250 (.00336)	.00250 (.00336)	.00250 (.00336)
C(S,P,E,T)	.01390 (.01866)	.01390 (.01866)	.01390 (.01866)	.01390 (.01866)
$R^2(X_1)$	.11381	.73754	.04336	.02497

$R^2(S,P,E,T) = .74471$

$R^2(S,P,D,T)^{+} = .74923$

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*Below each commonality coefficient and in parentheses is the normalized coefficient; that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-G-6

Commonality Coefficents* for the Degree of Individualization Growth Model--
Cohort 6, Spring 1973, Reading Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualitifications(T)
$U(X_i)$	.00145 (.00194)	.62018 (.82729)	.00757 (.01010)	.00003 (.00004)
C(S,P)	.07644 (.10197)	.07644 (.10197)		
C(S,E)	.00013 (.00017)		.00013 (.00017)	
C(S,T)	-.00002 (-.00003)			-.00002 (-.00003)
C(P,E)		.00127 (.00169)	.00127 (.00169)	
C(P,T)		.00188 (.00250)		.00188 (.00250)
C(E,T)			-.00000 (-.00000)	-.00000 (-.00000)
C(S,P,E)	.02565 (.03421)	.02565 (.03421)	.02565 (.03421)	
C(S,P,T)	.00311 (.00414)	.00311 (.00414)		.00311 (.00414)
C(S,E,T)	-.00000 (-.00000)		-.00000 (-.00000)	-.00000 (-.00000)
C(P,E,T)		.00072 (.00096)	.00072 (.00096)	.00072 (.00096)
C(S,P,E,T)	.01125 (.01501)	.01125 (.01501)	.01125 (.01501)	.01125 (.01501)
$R^2(X_i)$	.11801	.74050	.04659	.01696

$R^2(S,P,E,T) = .74965$

$R^2(S,P,D,T)^+ = .75427$

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*Below each commonality coefficient and in parentheses is the normalized coefficient; that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

APPENDIX V-H

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups from Cohorts 4 and 6 - Reading Total Score Analyses

TABLE V-H-1

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups-- Cohort 4, Spring 1972, Reading Total Score Analysis

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Students		14	48	23	52	53	47
Posttest Residualized for Pretest and SES	$\bar{X}$	-14.40	-14.68	-18.08	18.53	18.23	17.20
	SD	29.31	34.99	59.85	39.45	39.61	38.15
	g^1	-0.97	0.14	-1.51	0.60	1.34	-0.34
Pretest (National Norm = 419)	$\bar{X}$	424.57	408.39	446.04	506.61	434.06	453.37
	SD	56.77	60.61	56.09	42.22	52.01	48.32
	g	0.24	0.33	-1.04	-0.33	0.43	0.18
Posttest (National Norm = 457)	$\bar{X}$	450.19	425.58	452.22	554.78	485.05	497.86
	SD	64.30	75.01	67.11	42.78	63.32	47.08
	g	-0.97	0.20	0.07	0.29	0.42	-0.20
Reading Interest SP71	$\bar{X}$	100.71	99.18	102.19	102.47	100.17	100.27
	SD	10.01	10.40	9.33	9.54	10.93	9.58
	g	-0.59	-0.63	0.51	-0.54	-0.27	-0.08
Reading Interest SP72	$\bar{X}$	100.76	93.63	103.05	99.89	99.43	99.32
	SD	10.10	11.66	8.32	10.58	9.85	9.87
	g	-0.01	0.27	0.17	-0.33	-0.45	-0.01
SES	$\bar{X}$	109.19	93.66	90.12	110.75	100.33	96.18
	SD	6.03	5.26	5.99	6.11	8.05	6.60
	g	-0.08	0.60	0.11	-1.31	-0.26	1.37
Ethnic Group[2] (white=1; non-white=0)	$\bar{X}$	0.93	0.75	0.91	1.00	0.92	1.00

(continued)

[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is an EdExAG-group mean for variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-H-1 (continued)

Variable	Greatest Negative Outliers			Greatest Positive Outliers		
Sex[2] (girl=1;boy=0) $\bar{X}$	0.43	0.54	0.43	0.48	0.47	0.51
Utilization of Objectives	1.67	1.67	1.00	1.67	3.00	1.00
Individualization in Decision Making	1.00	2.00	1.00	1.67	1.00	1.00
Teacher or Locally Developed Materials	2.50	2.50	1.00	2.50	1.00	1.50
Individualization of Instructional Pace	2.00	3.00	1.00	2.00	2.00	1.00
Scheduling Characteristics	1.00	2.00	1.00	1.00	1.00	1.00
Use of Performance Agreements	1.00	2.00	1.00	2.00	1.00	1.00
Classroom Group Organization	1.00	2.00	1.00	1.00	3.00	1.00
Teaching Unit Composition	1.50	2.50	2.00	1.50	3.00	2.50
Completeness of Instructional Package	2.00	2.00	1.50	2.00	1.00	1.50
Utilization of Student Evaluation	2.67	2.67	1.67	2.67	2.33	2.33
Level of Innovation	16.33	22.33	12.17	18.00	18.33	13.83
Degree of Individualization	6.67	9.67	4.67	8.34	6.33	5.33
Number of School days per Year	180.00	180.00	180.00	180.00	180.00	180.00
Number of Minutes per Day	75.00	75.00	45.00	60.00	120.00	90.00

(continued)

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[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-H-1 (continued)

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Teachers	$\bar{X}$	1.00	1.00	1.00	1.00	2.00	1.00
Teacher's Age	$\bar{X}$	30.00	40.00	50.00	50.00	24.00	40.00
Teacher's Socioeconomic Background	$\bar{X}$	108.26	91.11	91.11	87.22	100.59	96.82
Teaching Qualifications	$\bar{X}$	99.43	104.57	108.14	114.11	88.87	101.77

TABLE V-H-2

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups-- Cohort 4, Spring 1973, Reading Total Score Analysis

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Students		26	60	13	18	29	39
Posttest Residualized for Pretest and SES	$\bar{X}$	-20.27	-21.65	-30.10	33.83	31.13	29.35
	SD	39.54	40.29	65.13	35.34	42.80	43.43
	g[1]	-1.45	-0.43	-0.16	0.85	0.59	0.07
Pretest (National Norm = 457)	$\bar{X}$	471.04	508.23	470.23	453.05	486.07	494.93
	SD	73.56	56.67	59.22	62.14	51.12	57.04
	g	0.77	-0.41	0.07	-0.57	0.37	0.00
Posttest (Interpolated National Norm = 490.5)	$\bar{X}$	481.75	521.83	470.33	515.60	552.32	559.76
	SD	78.53	64.42	78.34	60.12	74.74	78.70
	g	0.58	0.10	0.87	-0.47	0.70	-0.30
Reading Interest SP72	$\bar{X}$	*	99.49		92.58	101.22	98.36
	SD		9.87		8.17	9.54	8.82
	g		-0.27		0.49	-0.53	0.50
Reading Interest SP73	$\bar{X}$		102.33		108.59	103.02	104.54
	SD		9.00		5.78	9.56	7.02
	g		-0.29		0.10	0.11	-0.24
SES	$\bar{X}$	98.12	109.08	96.75	92.49	106.43	107.99
	SD	6.37	5.45	5.46	5.26	8.11	7.27
	g	0.67	-0.28	1.26	-0.68	-0.42	-0.61
Ethnic Group[2] (white=1; non-white=0)	$\bar{X}$	0.40	1.00	0.57	0.89	0.97	0.90

(continued)

[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is an EdExAG-group mean for variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

*Note: Blank entry indicates no data collected.

TABLE V-H-2 (continued)

Variable		Greatest Negative Outliers			Greatest Positive Outliers	
Sex[2] (girl=1;boy=0) $\bar{X}$	0.35	0.42	0.43	0.44	0.41	0.46
Utilization of Objectives	1.67	3.00	1.00	1.67	3.00	3.00
Individualization in Decision Making	1.67	1.33	1.00	1.67	2.00	1.00
Teacher or Locally Developed Materials	2.00	1.00	2.00	2.00	2.00	2.50
Individualization of Instructional Pace	2.00	1.00	2.00	2.00	3.00	2.00
Scheduling Characteristics	2.00	2.00	1.00	2.00	2.00	1.00
Use of Performance Agreements	1.00	1.00	1.00	2.00	3.00	2.00
Classroom Group Organization	2.00	2.00	2.00	2.00	2.00	2.00
Teaching Unit Composition	2.50	2.00	1.00	2.50	2.50	2.50
Completeness of Instructional Package	1.50	1.00	1.50	2.00	2.50	1.50
Utilization of Student Evaluation	2.67	2.33	1.00	1.67	3.00	2.67
Level of Innovation	19.00	16.67	13.50	19.50	25.00	20.17
Degree of Individualization	7.34	5.66	5.00	7.34	11.00	7.67
Number of School Days per Year	180.00	180.00	180.00	182.00	200.00	178.00
Number of Minutes per Day	110.00	60.00	50.00	65.00	60.00	90.00

(continued)

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[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-H-2(continued)

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Teacher/Student Contact Ratio[3]		3.97	3.13	3.87	3.33	3.33	3.33
Number of Teachers	$\bar{X}$	3.00	2.00	1.00	2.00	1.24	3.00
Teacher's Age	$\bar{X}$	28.00	34.83	30.00	40.00	40.00	40.00
Teacher's Socioeconomic Background	$\bar{X}$	106.44	99.32	96.90	94.69	110.42	109.52
Teaching Qualifications	$\bar{X}$	93.42	92.90	97.95	86.63	100.34	100.62

[3] Relative measure of teacher/student contact equal to the percent of teacher time per individual student.

TABLE V-H-3

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups-- Cohort 6, Spring 1972, Reading Total Score Analysis

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Students		158	54	110	86	232	105
Posttest Residualized for Pretest and SES	$\bar{X}$	-6.76	-8.98	-9.69	10.50	8.64	8.31
	SD	45.71	38.36	34.05	41.93	32.08	43.76
	g^1	0.24	-0.02	0.53	-0.11	-0.19	-0.28
Pretest (Interpolated National Norm = 490.5)	$\bar{X}$	548.41	525.68	472.17	518.67	487.90	528.89
	SD	67.85	65.78	63.72	71.01	66.59	71.10
	g	0.04	0.10	1.04	0.07	0.48	-0.19
Posttest (National Norm = 526)	$\bar{X}$	561.08	533.28	482.06	550.79	513.77	557.61
	SD	72.69	76.46	68.75	85.59	69.88	82.02
	g	-0.01	-0.38	0.52	-0.03	0.19	-0.15
Reading Interest SP71	$\bar{X}$	104.44	105.79	103.06	100.48	99.57	101.78
	SD	8.86	8.75	9.23	9.46	9.17	9.06
	g	-0.20	-0.36	-0.05	-0.01	-0.08	-0.11
Reading Interest SP72	$\bar{X}$	101.48	*	101.41	100.89	100.07	100.97
	SD	10.13		9.26	9.18	10.48	9.07
	g	0.05		-0.33	-0.08	-0.01	-0.07
SES	$\bar{X}$	109.02	99.37	94.39	107.23	93.16	107.01
	SD	6.98	9.00	8.68	8.42	6.69	7.39
	g	-1.28	0.57	0.44	-0.87	1.27	-0.71
Ethnic Group^2 (white=1;non-white=0)	$\bar{X}$	0.97	0.76	0.39	0.85	0.97	0.90

(continued)

[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is an EdExAG-group mean for variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

*Note: Blank entries indicate no data collected.

TABLE V-H-3 (continued)

Variable	Greatest Negative Outliers			Greatest Positive Outliers		
Sex[2] $\bar{X}$ (girl=1;boy=0)	0.47	0.57	0.55	0.47	0.58	0.57
Utilization of Objectives	3.00	1.00	1.67	3.00	3.00	3.00
Individualization in Decision Making	1.00	1.33	1.00	2.00	1.33	1.00
Teacher or Locally Developed Materials	2.50	2.00	1.00	2.00	3.00	2.00
Individualization of Instructional Pace	2.00	2.00	1.00	2.00	3.00	3.00
Scheduling Characteristics	3.00	1.00	1.00	2.00	2.00	2.00
Use of Performance Agreements	2.00	1.00	1.00	1.00	1.00	1.00
Classroom Group Organization	3.00	2.00	1.00	2.00	2.00	2.00
Teaching Unit Composition	1.00	2.00	1.00	2.00	2.50	2.00
Completeness of Instructional Package	2.00	1.50	1.50	2.50	2.50	2.50
Utilization of Student Evaluation	3.00	1.67	1.67	3.00	3.00	3.00
Level of Innovation	22.50	15.50	11.83	21.50	23.33	21.50
Degree of Individualization	3.00	6.00	4.67	8.00	8.33	8.00
Number of School Days per Year	180.00	180.00	180.00	200.00	180.00	200.00
Number of Minutes per Day	30.00	50.00	60.00	60.00	70.00	60.00

(continued)

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-H-3 (continued)

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Teachers	$\bar{X}$	4.00	1.00	1.23	2.71	1.00	1.93
Teacher's Age	$\bar{X}$	29.50	24.00	36.91	32.12	33.38	30.1[illegible]
Teacher's Socioeconomic Background	$\bar{X}$	111.32	108.26	93.91	97.40	101.45	112.20
Teaching Qualifications	$\bar{X}$	85.18	81.18	102.22	92.81	98.99	92.12

TABLE V-H-4

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups-- Cohort 6, Spring 1973, Reading Total Score Analysis

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Students		48	236	42	389	162	46
Posttest Residualized for Pretest and SES	$\bar{X}$	-9.98	-10.10	-11.84	11.38	9.75	3.51
	SD	33.62	39.90	34.59	50.72	37.03	45.44
	g[1]	0.17	-0.15	0.14	-1.43	0.19	0.99
Pretest (National Norm = 526)	$\bar{X}$	565.67	559.13	551.67	534.62	572.55	582.63
	SD	69.45	70.65	74.53	68.35	73.66	83.98
	g	0.34	0.30	0.29	0.62	0.10	0.30
Posttest (Interpolated National Norm = 553.5)	$\bar{X}$	575.40	568.33	560.30	563.69	603.34	605.58
	SD	74.17	81.50	84.38	84.23	77.23	89.01
	g	-0.15	0.28	0.08	0.17	0.21	0.30
Reading Interest SP72	$\bar{X}$	98.87	99.13	102.24	99.56	101.35	101.48
	SD	10.26	9.16	10.62	10.48	9.74	9.40
	g	0.08	0.36	-0.34	0.18	0.04	-0.12
Reading Interest SP73	$\bar{X}$	98.87	97.04	100.65	99.04	100.42	99.61
	SD	8.76	9.37	9.82	10.23	9.99	10.35
	g	0.07	0.38	-0.34	0.15	0.07	0.05
SES	$\bar{X}$	105.12	103.26	104.62	96.10	109.03	107.15
	SD	7.57	11.07	7.99	6.88	6.96	7.94
	g	-0.30	-0.86	-0.68	0.67	-1.16	-0.81
Ethnic Group[2] (white=1; nonwhite=0)	$\bar{X}$	0.88	0.83	0.81	0.96	0.98	0.93

(continued)

[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is an EdExAG-group mean for variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-H-4 (continued)

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Sex[2] (girl=1;boy=0)	$\bar{X}$	0.52	0.48	0.55	0.55	0.49	0.57
Utilization of Objectives	$\bar{X}$	3.00	3.00	3.00	1.67	3.00	3.00
Individualization in Decision Making	$\bar{X}$	1.00	1.67	2.00	1.00	1.00	1.33
Teacher or Locally Developed Materials		2.00	3.00	2.00	2.00	2.50	1.50
Individualization of Instructional Pace		2.00	2.00	3.00	1.00	2.00	2.00
Scheduling Characteristics		2.00	2.00	2.00	1.00	3.00	2.00
Use of Performance Agreements		3.00	2.00	3.00	1.00	2.00	2.00
Classroom Group Organization		1.00	2.00	2.00	2.00	2.00	2.00
Teaching Unit Composition		2.50	2.00	2.50	1.00	1.00	2.50
Completeness of Instructional Package		2.50	2.50	2.50	1.00	2.00	1.50
Utilization of Student Evaluation		3.00	3.00	2.33	1.33	3.00	3.00
Level of Innovation		22.00	23.17	24.33	13.00	21.50	20.83
Degree of Individualization		9.00	8.67	10.33	4.33	8.00	8.33
Number of School Days per Year		200.00	180.00	200.00	182.00	178.00	200.00
Number of Minutes per Day		50.00	50.00	50.00	50.00	30.00	50.00

(continued)

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[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-H-4 (continued)

Variable	Greatest Negative Outliers			Greatest Positive Outliers		
Teacher/Student Contact Ratio[3]	3.33	4.00	3.33	3.35	2.86	3.33
Number of Teachers $\bar{X}$	1.02	5.59	1.02	1.00	6.00	1.02
Teacher's Age $\bar{X}$	30.00	38.00	40.00	39.18	34.00	24.17
Teacher's Socioeconomic Background $\bar{X}$	100.93	103.14	93.95	102.18	110.15	107.04
Teaching Qualifications $\bar{X}$	90.62	100.58	106.55	103.18	91.50	92.46

[3] Relative measure of teacher/student contact equal to the percent of teacher time per individual student.

APPENDIX V-I

Language Total Score Analysis Tables*

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*Variable names for the abbreviations used in this appendix are found in Appendix IV-H. Methods to be used for testing the statistical significance of the correlations shown vary depending upon whether or not the variables were measured at the student level or at the EdExAG-group level. These issues are discussed in Chapter IV and in Appendix IV-E.

Critical values for the correlations of the EdExAG variables with SES, pretest and posttest are found in Tables V-I-18, V-I-19 and V-I-32 as are the critical values for correlations among the student-level variables. Critical values for intercorrelations of EdExAG-level variables with EdExAG-level variables are noted on each of the tables in which such correlations have been included, along with the effective sample size, k_{eff} (see Appendix IV-E). EdExAG-variable correlations exceeding the noted value are statistically significant at $p < .05$ (two-tailed) with $(k_{eff} - 2)$ degrees of freedom.

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TABLE V-I-1

Descriptive Summary of the Language Total Score Analysis Samples

Variable	Cohort 1 SP72		Cohort 1 SP73		Cohort 4 SP72		Cohort 4 SP73		Cohort 6 SP72		Cohort 6 SP73	
Grade (pretest year/posttest year)	1/2		2/3		4/5		5/6		6/7		7/8	
Total Number of Students	787		755		1995		1902		1491		1507	
Number of EdExAG Groups	18		17		42		44		11		13	
Number of Different Schools/Sites	13/5		13/5		35/13		34/13		7/7		7/7	
Mean ($\bar{X}$) and Standard Deviation (SD) by Variable	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Posttest-Language Total Score Residualized for Time of Testing	334.31	63.34	400.00	68.00	476.31	76.27	510.72	75.75	528.91	80.09	561.67	81.42
National Norm - Posttest[1]	327	-	382	-	461	-	497	-	531.5	-	557.0	-
Pretest-Language Total Score Residualized for Time of Testing	93.83[2]	10.60[2]	334.06	64.91	437.52	66.02	480.54	72.23	510.89	69.59	545.33	73.99
National Norm - Pretest[1]	85[3]	-	327	-	422	-	461	-	497	-	531.5	-
Socioeconomic Status	100.05	9.99	100.62	9.92	99.56	9.97	99.78	9.88	99.55	9.94	100.21	9.79
Utilization of Objectives	2.66	0.72	2.69	0.64	2.43	0.84	2.48	0.71	2.41	0.76	2.48	0.65
Individualization in Decision Making[4]	1.40	0.53	1.50	0.51	1.39	0.43	1.39	0.42	1.26	0.30	1.26	0.33
Teacher or Locally Developed Materials	1.66	0.48	1.76	0.37	1.80	0.55	1.95	0.57	2.34	0.60	2.40	0.49

(continued)

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[1] The 50th percentile score in Expanded Scale Score units for testing conducted between month 6 and 9 for Form R (SP71,SP73) and Form Q (SP72) - from norms table found in the CTBS Examiner's Manual. Interpolated scale score norms have a decimal point.

[2] Based on CTMM Mental Age - Language score from Spring 1971.

[3] According to the CTMM Examiner's Manual a grade placement of 1.7 (the approximate time of testing) corresponds with a chronological age of 85 months.

[4] One of the scales summed to form the scale Degree of Individualization.

TABLE V-I-1 (continued)

Variable	Cohort 1 SP72		Cohort 1 SP73		Cohort 4 SP72		Cohort 4 SP73		Cohort 6 SP72		Cohort 6 SP73	
	X̄	SD	X̄	SD	X̄	SD	X̄	SD	X̄	SD	X̄	SD
Individualization of Instructional Pace[4]	2.26	0.67	2.22	0.47	1.98	0.65	2.19	0.66	2.01	0.76	1.93	0.68
Scheduling Characteristics	1.73	0.72	1.77	0.63	1.59	0.62	1.67	0.59	1.80	0.83	1.69	0.66
Use of Performance Agreements[4]	1.63	0.61	1.97	0.85	1.51	0.64	1.72	0.78	1.44	0.63	1.68	0.76
Classroom Group Organization	2.13	0.71	2.30	0.46	1.87	0.73	2.10	0.62	2.04	0.42	1.90	0.35
Teaching Unit Composition	2.02	0.72	2.22	0.69	1.83	0.71	1.84	0.66	1.65	0.60	1.69	0.68
Completeness of Instructional Package	2.21	0.64	2.11	0.54	1.97	0.60	2.05	0.48	1.95	0.62	1.90	0.63
Utilization of Student Evaluation[4]	2.45	0.63	2.51	0.50	2.42	0.65	2.55	0.51	2.36	[illegible].73	2.32	0.80
Degree of Individualization[5]	7.74	1.80	8.20	1.47	7.30	1.82	7.86	1.56	7.07	1.85	7.19	1.92
Level of Innovation[6]	20.14	4.34	21.05	3.27	18.80	4.41	19.95	3.55	19.27	4.73	19.26	4.45
Number of Minutes per Day	96.74	27.82	95.48	34.37	95.0	26.73	81.73	26.25	55.06	10.97	50.33	8.30
Teacher Age	31.89	7.80	35.48	10.52	36.52	10.72	36.15	9.93	33.26	9.92	36.99	9.56
Teacher Socioeconomic Background	102.52	7.87	101.52	10.43	98.92	9.74	98.77	10.18	105.83	7.82	102.63	9.84
Teaching Qualifications	97.56	7.82	100.96	6.32	102.45	7.89	99.84	7.45	95.18	8.22	98.84	6.48

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[4] One of the scales summed to form the scale Degree of Individualization.

[5] A superindex equal to the sum of the four scales noted in footnote 4.

[6] A superindex equal to the sum of the ten EdExAG scales, Utilization of Objectives through Utilization of Student Evaluation.

TABLE V-I-2

Mean Differences between Language Total Pretest and Posttest Scores and Standardized Gains

	Cohort 1[1] SP73	Cohort 4 SP72	Cohort 4 SP73	Cohort 6 SP72	Cohort 6 SP73
Mean Difference	65.94	38.79	30.18	18.02	16.34
"Standardized" Gain[2]	.99	.54	.41	.24	.21

[1] The SP72 comparison is not included for Cohort 1 because the CTMM Mental Age-Language was the pretest measure.

[2] From Equation V-1 in the text.

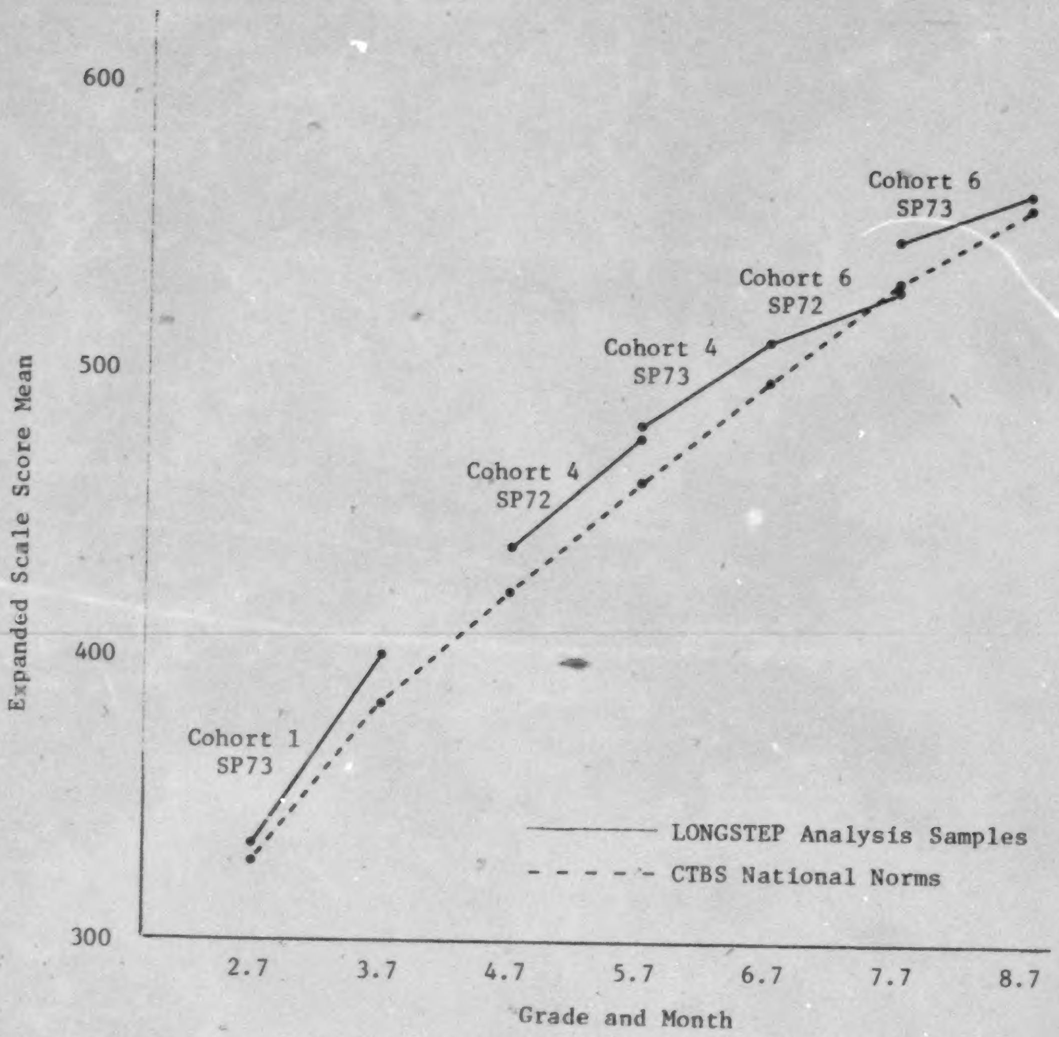

Figure V-I-1. Pretest and posttest means and published national norms (50th percentile for spring testing) - Language Total Score Analyses.

TABLE V-I-3

Posttest/Norm and Pretest/Norm Comparisons - Language Total Score Analyses

	Cohort 1		Cohort 4		Cohort 6	
	SP72	SP73	SP72	SP73	SP72	SP73
Posttest Mean/ Norm Difference[1]	7.31	18.00	15.31	13.72	-2.59	4.67
Posttest Difference Ratio[2]	.12	.26	.20	.18	-.03	.06
Pretest Mean/ Norm Difference[1]	*	7.06	15.52	19.54	13.89	13.83
Pretest Difference Ratio[3]	*	.11	.24	.27	.20	.19

[1] Norm based on 50th percentile for spring testing.

[2] $$\frac{\overline{X}_{posttest} - Norm}{SD_{posttest}}$$

[3] $$\frac{\overline{X}_{pretest} - Norm}{SD_{pretest}}$$

*CTMM was used.

TABLE V-I-4

Maximum Possible Posttest and Pretest Mean Shifts Attributable to Test Topout Effects - Language Total Score Analyses

Cohort, Analysis Sample[1]	Analysis Sample			Analysis Sample and Topouts[2]			Mean Difference[3]	
	$\bar{X}_{posttest}$	$\bar{X}_{pretest}$	N	$\bar{X}_{posttest}$	$\bar{X}_{pretest}$	N	Posttest	Pretest
Cohort 1, SP73	400.00	334.06	755	400.31	334.46	756	.31	.40
Cohort 4, SP72	476.31	437.52	1995	477.91	438.68	2007	1.60	1.16
Cohort 4, SP73	510.72	480.54	1902	513.38	483.55	1924	2.66	3.01
Cohort 6, SP72	528.91	510.89	1491	532.08	512.75	1503	3.17	1.86
Cohort 6, SP73	561.67	545.33	1507	561.67	545.33	1507	.00	.00

[1] Cohort 1, SP72 is not included because the pretest was the CTMM and the posttest, the CTBS.

[2] Means shown here were computed assuming that students who topped out obtained the maximum pretest and posttest scores.

[3] Absolute value of the difference.

TABLE V-I-5

Commonality Analysis of SES -- Cohort 1, Spring 1972, Language Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes (D)	Teacher Variables (T)
$U(X_i)$	.03774	.36556	.00085
C(P,D)	-.01238	-.01238	
C(P,T)	.00055		.00055
C(D,T)		.02534	.02534
C(P,D,T)	-.00106	-.00106	-.00106
$R^2(X_i)$	.02484	.37746	.02569

$R^2(P,D,T) = .41660$

TABLE V-I-6

Commonality Analysis of SES -- Cohort 1, Spring 1973, Language Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes (D)	Teacher Variables (T)
$U(X_i)$	.03812	.26953	.00390
C(P,D)	.08297	.08297	
C(P,T)	-.00101		-.00101
C(D,T)		.04049	.04049
C(P,D,T)	.02900	.02900	.02900
$R^2(X_i)$	.14909	.42199	.07238

$R^2(P,D,T) = .46301$

TABLE V-I-7

Commonality Analysis of SES -- Cohort 4, Spring 1972, Language Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes (D)	Teacher Variables (T)
$U(X_i)$	.02366	.41364	.00071
C(P,D)	.05603	.05603	
C(P,T)	.00066		.00066
C(D,T)		.04596	.04596
C(P,D,T)	-.00027	-.00027	-.00027
$R^2(X_i)$	.08008	.51536	.04706

$R^2(P,D,T) = .54039$

TABLE V-I-8

Commonality Analysis of SES -- Cohort 4, Spring 1973, Language Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes (D)	Teacher Variables (T)
$U(X_i)$	.02116	.33699	.00049
C(P,D)	.05955	.05955	
C(P,T)	.00045		.00045
C(D,T)		.09695	.09695
C(P,D,T)	.01354	.01354	.01354
$R^2(X_i)$	.09470	.50702	.11143

$R^2(P,D,T) = .52913$

TABLE V-I-9

Commonality Analysis of SES -- Cohort 6, Spring 1972, Language Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes (D)	Teacher Variables (T)
$U(X_i)$	.01470	.19574	.00050
C(P,D)	.01838	.01838	
C(P,T)	.00067		.00067
C(D,T)		.07565	.07565
C(P,D,T)	.01639	.01639	.01639
$R^2(X_i)$	.05014	.30617	.09321

$R^2(P,D,T) = .32204$

TABLE V-I-10

Commonality Analysis of SES -- Cohort 6, Spring 1973, Language Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes (D)	Teacher Variables (T)
$U(X_i)$	.03235	.20718	.00013
C(P,D)	.02851	.02851	
C(P,T)	.00021		.00021
C(D,T)		.04097	.04097
C(P,D,T)	.00827	.00827	.00827
$R^2(X_i)$	.06934	.28493	.04958

$R^2(P,D,T) = .31762$

TABLE V-I-11

Commonality Analysis of Pretest -- Cohort 1, Spring 1972, Language Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.05631	.09500	.00553
C(S,D)	-.03051	-.03051	
C(S,T)	.00110		.00110
C(D,T)		.00412	.00412
C(S,D,T)	-.00205	-.00205	-.00205
$R^2(X_i)$	.02484	.06656	.00871

$R^2(S,D,T) = .12951$

TABLE V-I-12

Commonality Analysis of Pretest -- Cohort 1, Spring 1973, Language Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.05191	.09714	.00591
C(S,D)	.07246	.07246	
C(S,T)	-.00133		-.00133
C(D,T)		.01664	.01664
C(S,D,T)	.02604	.02604	.02604
$R^2(X_i)$	.14909	.21228	.04726

$R^2(S,D,T) = .26877$

TABLE V-I-13

Commonality Analysis of Pretest -- Cohort 4, Spring 1972, Language Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.04167	.09579	.01494
$C(S,D)$	.04093	.04093	
$C(S,T)$	.00188		.00188
$C(D,T)$		-.00017	-.00017
$C(S,D,T)$	-.00441	-.00441	-.00441
$R^2(X_i)$	.08008	.13215	.01224

$R^2(S,D,T) = .19064$

TABLE V-I-14

Commonality Analysis of Pretest -- Cohort 4, Spring 1973, Language Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.03645	.08589	.01286
$C(S,D)$	.05315	.05315	
$C(S,T)$	.00133		.00133
$C(D,T)$		-.00440	-.00440
$C(S,D,T)$	.00377	.00377	.00377
$R^2(X_i)$	.09470	.13841	.01356

$R^2(S,D,T) = .18904$

TABLE V-I-15

Commonality Analysis of Pretest --
Cohort 6, Spring 1972, Language Total Score Analysis

	SES(S)	EdExAC Dummy Codes(D)	Teacher Variable(T)
$U(X_i)$	.01983	.02541	.00844
C(S,D)	.01576	.01576	
C(S,T)	.00108		.00108
C(D,T)		.00146	.00146
C(S,D,T)	.01347	.01347	.01347
$R^2(X_i)$	.05014	.05611	.02446

$R^2(S,D,T) = .08546$

TABLE V-I-16

Commonality Analysis of Pretest --
Cohort 6, Spring 1973, Language Total Score Analysis

	SES(S)	EdExAC Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.04338	.01017	.00204
C(S,D)	.01992	.01992	
C(S,T)	.00038		.00038
C(D,T)		.00337	.00337
C(S,D,T)	.00567	.00567	.00567
$R^2(X_i)$	.06934	.03913	.01145

$R^2(S,D,T) = .08492$

TABLE V-I-17

Proportions of SES and Pretest Variance Attributable to EdExAG-group Membership

	Cohort 1 SP72	Cohort 1 SP73	Cohort 4 SP72	Cohort 4 SP73	Cohort 6 SP72	Cohort 6 SP73
SES[1]						
$R^2_{SES}(D_j)$	.38	.42	.52	.51	.31	.28
Pretest						
$R^2_{pretest}(D_j)$	.07	.21	.13	.14	.06	.04
$U_{pretest}(D_j)$[2]	.10	.10	.10	.09	.03	.01
$U_{pretest}(SES)$[3]	.06	.05	.04	.04	.02	.04

[1] Among-group differences with respect to SES that were independent of concomitant differences in pretest were not computed because of the theoretical primacy of SES; that is, it was reasonable to view SES as an antecedent of test performance but not vice versa.

[2] This commonality analysis uniqueness is equal to the proportion of variance in pretest that is attributable to EdExAG-group membership after group differences with respect to SES and the teacher variables are taken into account.

[3] This uniqueness is equal to the proportion of variance in pretest that is attributable to SES, independent of group differences on SES and all teacher-variable differences; that is, it is a within-groups uniqueness.

TABLE V-I-18

Correlations of SES with the Key Analysis Variables - Language Total Score Analysis

Level of Correlation	Variable	Cohort 1 SP 72	Cohort 1 SP 73	Cohort 4 SP 72	Cohort 4 SP 73	Cohort 6 SP 72	Cohort 6 SP 73
Student/ Student	Pretest	.157	.386	.282	.307	.223	.263
	Teacher's Age	.016	-.100	-.032	-.118	-.095	-.177
	Teacher's Socioeconomic Background	-.004	.029	.208	.329	.167	.081
	Teaching Qualifications	.136	.165	-.061	-.071	-.256	-.204
EdExAC/ Student	Utilization of Objectives	.312	.301	.291	.164	.194	.289
	Individualization in Decision Making	-.011	.064	-.008	-.080	.091	.176
	Teacher or Locally Developed Materials	.039	-.191	.071	-.168	.004	-.063
	Individualization of Instructional Pace	.120	.232	.248	-.074	.033	.058
	Scheduling Characteristics	-.022	-.097	.056	-.107	.346	.363
	Use of Performance Agreements	-.032	-.089	.075	.087	.128	.354
	Classroom Group Organization	-.151	-.098	-.000	-.224	.332	.045
	Teaching Unit Composition	.258	.193	.084	-.008	-.138	.082

(continued)

TABLE V-I-18 (continued)

Level of Correlation	Variable	Cohort 1 SP 72	Cohort 1 SP 73	Cohort 4 SP 72	Cohort 4 SP 73	Cohort 6 SP 72	Cohort 6 SP 73
EdExAG/ Student	Completeness of Instructional Package	.216	.234	.311	-.030	.149	.158
	Utilization of Student Evaluation	.235	.274	.216	-.140	.260	.235
	Degree of Individualization	.112	.138	.191	-.056	.174	.289
	Level of Innovation	.149	.146	.207	-.081	.192	.252
	Number of Minutes per Day	-.151	.174	.073	-.096	-.275	-.363
r (p< .05) - Student/Student Level[1]		.069	.071	.043	.044	.050	.050
r (p< .05) - EdExAG/Student Level[2]		.055	.054	.030	.031	.042	.042

[1] Absolute value of the coefficient required for a correlation between two student-level variables to be statistically significant ($\alpha \leqq .05$, two-tailed). Due to the large number of degrees of freedom, the critical ratio $z = r/\sigma_r$ where $\sigma_r = 1/\sqrt{N}$ was used.

[2] Absolute value of the coefficient required for a correlation between one student-level variable (SES) and an EdExAG-level variable to be statistically significant ($\alpha \leqq .05$, two-tailed)--see Equation IV-3 for the computing formula.

Note: For convenience, all coefficients in this table were truncated to three decimal places -- see Tables V-I-20 through V-I-25 for correlations with five-place accuracy.

TABLE V-I-19

Correlations of Pretest with the Key Analysis Variables - Language Total Score Analysis

Level of Correlation	Variable	Cohort 1 SP72	Cohort 1 SP73	Cohort 4 SP72	Cohort 4 SP73	Cohort 6 SP72	Cohort 6 SP73
Student/ Student	Socioeconomic Background	.157	.386	.282	.307	.223	.263
	Teacher's Age	.075	-.029	.052	.054	-.097	-.094
	Teacher's Socioeconomic Background	.017	-.109	-.006	.089	.089	.036
	Teaching Qualifications	.038	.141	.100	.041	-.149	-.048
EdExAG/ Student	Utilization of Objectives	-.062	.112	.040	-.021	.101	.085
	Individualization in Decision Making	-.059	.003	.015	-.049	.035	.105
	Teacher or Locally Developed Materials	-.105	-.122	-.046	-.093	.081	-.039
	Individualization of Instructional Pace	-.008	.055	.055	-.088	.026	-.011
	Scheduling Characteristics	-.061	-.115	-.045	-.148	.143	.089
	Use of Performance Agreements	-.089	-.056	.064	-.016	.157	.077
	Classroom Group Organization	.071	-.011	-.014	-.181	.139	.016
	Teaching unit Composition	-.118	.099	-.007	-.089	-.053	.035

(continued)

TABLE V-I-19 (continued)

Level of Correlation	Variable	Cohort 1 SP72	Cohort 1 SP73	Cohort 4 SP72	Cohort 4 SP73	Cohort 6 SP72	Cohort 6 SP73
EdExAG/ Student	Completeness of Instructional Package	-.126	-.030	.039	-.050	.073	.029
	Utilization of Student Evaluation	-.121	.174	.084	-.082	.095	.079
	Degree of Individualization	-.092	.045	.076	-.085	.107	.078
	Level of Innovation	-.097	.020	.028	-.137	.109	.066
	Number of Minutes per Day	-.036	.111	.002	-.064	-.133	-.092
$r(p < .05)$ - Student/Student Level[1]		.069	.071	.043	.044	.050	.050
$r(p < .05)$ - EdExAG/Student Level[2]		.068	.064	.041	.042	.049	.050

[1] Absolute value of the coefficient required for a correlation between two student-level variables to be statistically significant ($\alpha \leqq .05$, two-tailed). Due to the large number of degrees of freedom, the critical ratio $z = r/\sigma_r$ where $\sigma_r = 1/\sqrt{N}$ was used.

[2] Absolute value of the coefficient required for a correlation between one student-level variable (Pretest) and an EdExAG-level variable to be statistically significant ($\alpha \leqq .05$, two-tailed)--see Equation IV-3 for the computing formula.

Note: For convenience, all coefficients in this table were truncated to three decimal places -- see Tables V-I-20 through V-I-25 for correlations with five-place accuracy.

TABLE V-I-20

Intercorrelations among the Key Analysis Variables -- Cohort 1, Spring 1972, Language Total Score Analysis

$[\ r\ (p<.05) = .576\ ,\ k_{eff} = 12\ ]$

	RESL72	COMPSES	RESL71	SUM04	SUM10	E2NMIN	T2TQ	E2UO	E2IDM	E2TLDM	E2IIP	E2SC
RESL72	1.00000	0.37027	0.36876	0.06618	0.08654	-0.02592	0.00340	0.13355	-0.06206	-0.01816	0.09549	0.08001
COMPSES	0.37027	1.00000	0.15762	0.11216	0.14921	-0.15152	0.13651	0.31240	-0.01199	0.03929	0.12091	-0.02220
RESL71	0.36876	0.15762	1.00000	-0.09293	-0.09745	-0.03675	0.03801	-0.06268	-0.05954	-0.10543	-0.00858	-0.06102
SUM04	0.06618	0.11216	-0.09293	1.00000	0.96517	-0.01693	0.13866	0.74844	0.72036	0.60415	0.68302	0.69998
SUM10	0.08654	0.14921	-0.09745	0.96517	1.00000	-0.14814	0.05181	0.83122	0.66557	0.58862	0.60367	0.76221
E2NMIN	-0.02592	-0.15152	-0.03675	-0.01693	-0.14814	1.00000	-0.00515	-0.16131	-0.09332	0.07050	0.09316	-0.28354
T2TQ	0.00340	0.13651	0.03801	0.13866	0.05181	-0.00515	1.00000	0.04367	0.11876	0.06623	0.14286	-0.12078
E2UO	0.13355	0.31240	-0.06268	0.74844	0.83122	-0.16131	0.04367	1.00000	0.35671	0.26209	0.62118	0.47836
E2IDM	-0.06206	-0.01199	-0.05954	0.72036	0.66557	-0.09332	0.11876	0.35671	1.00000	0.63872	0.27005	0.41667
E2TLDM	-0.01816	0.03929	-0.10543	0.60415	0.58862	0.07050	0.06623	0.26209	0.63872	1.00000	0.06149	0.33278
E2IIP	0.09549	0.12091	-0.00858	0.68302	0.60367	0.09316	0.14286	0.62118	0.27005	0.06149	1.00000	0.50140
E2SC	0.08001	-0.02220	-0.06102	0.69998	0.76221	-0.28354	-0.12078	0.47836	0.41667	0.33278	0.50140	1.00000
E2UPA	0.03671	-0.03205	-0.08952	0.80007	0.83197	-0.24748	0.00062	0.49727	0.51213	0.50005	0.36362	0.85580
E2CGO	0.02346	-0.15121	0.07130	0.52521	0.50762	-0.06068	0.02403	0.47714	0.44094	0.02561	0.41953	0.32675
E2TUC	0.10898	0.25813	-0.11381	0.58154	0.69870	-0.22327	0.00034	0.64806	0.48912	0.44846	0.00408	0.35146
E2CIP	0.02511	0.21617	-0.12666	0.40231	0.47347	-0.19259	-0.03065	0.40472	0.09106	0.33130	0.38524	0.52454
E2USE	0.10533	0.23516	-0.12190	0.77074	0.77046	0.16984	0.14632	0.71113	0.44990	0.65392	0.31954	0.30174
T2AGE	0.01690	0.01623	0.07553	0.22521	0.14342	0.06173	0.00446	0.08291	0.12005	0.07069	0.18884	0.03212
T2TSB	0.00003	-0.00408	0.01700	-0.26239	-0.20641	-0.10934	-0.12471	-0.06105	-0.22980	-0.15984	-0.15144	-0.10162
PCT71	0.16383	0.45703	-0.00000	-0.12780	-0.15174	0.06756	0.30574	0.27322	-0.31506	-0.28514	0.14062	-0.43950
PCT72	-0.00000	0.07436	0.11909	-0.22404	-0.30285	0.10705	0.25332	0.09557	-0.32207	-0.48605	0.27383	-0.43048
MAL71	0.39443	0.25168	0.97501	-0.11874	-0.12624	-0.02114	0.10286	-0.00266	-0.12613	-0.16495	0.02153	-0.15435
LTOT72	0.99487	0.37589	0.37891	0.04318	0.05546	-0.01496	0.02900	0.14254	-0.09432	-0.06723	0.12269	0.03606

	E2UPA	E2CGO	E2TUC	E2CIP	E2USE	T2AGE	T2TSB	PCT71	PCT72	MAL71	LTOT72
RESL72	0.03671	0.02346	0.10898	0.02511	0.10533	0.01690	0.00003	0.16383	-0.00000	0.39443	0.99487
COMPSES	-0.03205	-0.15121	0.25819	0.21617	0.23515	0.01625	-0.00403	0.45703	0.07436	0.25168	0.37589
RESL71	-0.08952	0.07130	-0.11881	-0.12666	-0.12190	0.07553	0.01700	-0.00000	0.11909	0.97501	0.37891
SUM04	0.80007	0.52521	0.58154	0.40231	0.77074	0.22521	-0.26239	-0.12780	-0.22404	-0.11874	0.04318
SUM10	0.83197	0.50762	0.69870	0.47347	0.77046	0.14342	-0.20641	-0.15174	-0.30285	-0.12824	0.05546
E2NMIN	-0.24748	-0.06068	-0.22327	-0.19259	0.16984	0.06173	-0.10934	0.06756	0.10705	-0.02114	-0.01496
T2TQ	0.00062	0.02403	0.00034	-0.03065	0.14632	0.00446	-0.12471	0.30574	0.25332	0.10286	0.02900
E2UO	0.49727	0.47714	0.64808	0.40472	0.71113	0.08291	-0.06105	0.27322	0.09557	-0.00266	0.14254
E2IDM	0.51213	0.44094	0.48912	0.09106	0.44990	0.12005	-0.22980	-0.31506	-0.32207	-0.12613	-0.09432
E2TLDM	0.50005	0.02561	0.44846	0.33130	0.65392	0.07069	-0.15984	-0.28514	-0.48605	-0.16495	-0.06723
E2IIP	0.36362	0.41953	0.00408	0.38524	0.31954	0.18884	-0.15144	0.14062	0.27383	0.02153	0.12269
E2SC	0.85580	0.32675	0.35146	0.52454	0.30174	0.03212	-0.10162	-0.43950	-0.43048	-0.15435	0.03606
E2UPA	1.00000	0.40286	0.55469	0.41726	0.51771	0.13568	-0.13920	-0.42700	-0.43672	-0.17960	-0.01372
E2CGO	0.40286	1.00000	0.20606	-0.39514	0.30393	0.25628	-0.10641	-0.22648	0.19140	0.02249	0.04270
E2TUC	0.55469	0.20606	1.00000	0.19507	0.72323	0.04885	-0.15904	-0.01468	-0.48179	-0.11952	0.05969
E2CIP	0.41726	-0.39514	0.19507	1.00000	0.26679	-0.18508	-0.05984	-0.00154	-0.35357	-0.12527	-0.01078
E2USE	0.51771	0.30393	0.72323	0.26679	1.00000	0.21474	-0.26615	0.16001	-0.18663	-0.08522	0.08591
T2AGE	0.13568	0.25628	0.04885	-0.18508	0.21474	1.00000	-0.41259	0.11155	0.20823	0.09804	0.03787
T2TSB	-0.13920	-0.10641	-0.15904	-0.05984	-0.26615	-0.41259	1.00000	0.04049	0.16514	0.02545	0.01673
PCT71	-0.42700	-0.22648	-0.01468	-0.00154	0.16001	0.11155	0.04049	1.00000	0.64597	0.21484	0.22833
PCT72	-0.43672	0.19140	-0.48179	-0.35357	-0.18663	0.20823	0.16514	0.64597	1.00000	0.25588	0.10115
MAL71	-0.17960	0.02249	-0.11952	-0.12527	-0.08522	0.09804	0.02545	0.21484	0.25588	1.00000	0.41823
LTOT72	-0.01372	0.04270	0.05969	-0.01078	0.08591	0.03787	0.01673	0.22833	0.10115	0.41823	1.00000

TABLE V-I-21

Intercorrelations among the Key Analysis Variables -- Cohort 1, Spring 1973, Language Total Score Analysis

$[\ r\ (p<.05) = .602\ ,\ k_{eff} = 11\ ]$

	RESL73	COMPSES	RESL72	SUM04	SUM10	E3NMIN	T3TQ	E3UO	E3IDM	E3TLDM	E3IIP	E3SC
RESL73	1.00000	0.23189	0.76656	-0.10034	-0.13902	-0.06436	0.12677	-0.07722	-0.09865	-0.11421	-0.00438	-0.15776
COMPSES	0.23189	1.00000	0.38612	0.13817	0.14658	0.17497	0.16553	0.30123	0.06494	-0.19172	0.23221	-0.09744
RESL72	0.76656	0.38612	1.00000	0.04572	0.02069	0.11191	0.14156	0.11224	0.00328	-0.12263	0.05567	-0.11544
SUM04	-0.10034	0.13817	0.04572	1.00000	0.95721	-0.12260	0.01764	0.61182	0.81022	0.23058	0.21796	0.62723
SUM10	-0.13902	0.14658	0.02069	0.95721	1.00000	-0.04420	0.01040	0.75494	0.75115	0.18436	0.17802	0.71117
E3NMIN	-0.06436	0.17497	0.11191	-0.12260	-0.04420	1.00000	-0.04549	0.15512	-0.30146	0.20128	-0.15618	-0.28695
T3TQ	0.12677	0.16553	0.14156	0.01764	0.01040	-0.04549	1.00000	-0.01681	-0.08790	0.11110	0.11664	-0.20904
E3UO	-0.07722	0.30123	0.11224	0.61182	0.75494	0.15512	-0.01681	1.00000	0.39452	-0.34061	0.23338	0.49245
E3IDM	-0.09865	0.06494	0.00323	0.81022	0.75115	-0.30146	-0.08790	0.39452	1.00000	0.02579	0.11687	0.79752
E3TLDM	-0.11421	-0.19172	-0.12263	0.23058	0.18436	0.20128	0.11110	-0.34061	0.02579	1.00000	-0.36129	-0.00910
E3IIP	-0.00438	0.23221	0.05567	0.21796	0.17802	-0.15618	0.11664	0.23338	0.11687	-0.36129	1.00000	-0.08308
E3SC	-0.15776	-0.09744	-0.11544	0.62723	0.71117	-0.28695	-0.20904	0.49245	0.79752	-0.00910	-0.08308	1.00000
E3UPA	-0.08153	-0.08930	-0.05609	0.86348	0.82153	-0.25224	-0.01806	0.43225	0.64689	0.40002	-0.07189	0.58065
E3CGO	0.05680	-0.09874	-0.01178	0.19154	0.23212	-0.61032	-0.22269	0.32315	0.36688	-0.56647	0.33348	0.51750
E3TUC	-0.08844	0.19393	0.09990	0.57557	0.66883	0.38955	0.15842	0.51766	0.30829	0.45296	-0.29744	0.28575
E3CIP	-0.14939	0.23452	-0.03045	0.55683	0.54265	0.10561	0.19110	0.43729	0.21601	0.12882	0.64048	0.04402
E3USE	-0.05214	0.27409	0.17408	0.44636	0.48927	0.52060	0.06297	0.44546	0.15667	0.31163	-0.29222	0.12448
T3AGE	0.04745	-0.10094	-0.02902	-0.04750	-0.00610	-0.20284	0.49898	-0.08862	-0.05756	0.22034	-0.30923	0.05054
T3TSB	-0.11150	0.02942	-0.10964	0.00197	-0.00807	-0.00635	-0.04198	0.08763	-0.07355	-0.19454	0.49072	-0.14649
PCT72	0.06908	0.08785	-0.00000	-0.61535	-0.54994	-0.16485	-0.07518	-0.02906	-0.52865	-0.74075	0.22686	-0.38087
PCT73	-0.00000	0.49436	0.22811	0.03422	0.10403	0.57646	0.27962	0.32803	-0.01171	-0.04140	-0.05134	-0.20775
LTOT72	0.76948	0.39122	0.99766	0.00357	-0.01693	0.10038	0.13609	0.10999	-0.03286	-0.17296	0.07104	-0.14120
LTOT73	0.97715	0.33168	0.79752	-0.09077	-0.11373	0.05965	0.18331	-0.00573	-0.09888	-0.12040	-0.01519	-0.19831

	E3UPA	E3CGO	E3TUC	E3CIP	E3USE	T3AGE	T3TSB	PCT72	PCT73	LTOT72	LTOT73
RESL73	-0.08153	0.05680	-0.08844	-0.14939	-0.05214	0.04745	-0.11150	0.06908	-0.00000	0.76948	0.97715
COMPSES	-0.08930	-0.09874	0.19393	0.23452	0.27409	-0.10094	0.02942	0.08785	0.49436	0.39122	0.33168
RESL72	-0.05609	-0.01178	0.09990	-0.03045	0.17408	-0.02902	-0.10964	-0.00000	0.22811	0.99766	0.79752
SUM04	0.86348	0.19154	0.57557	0.55683	0.44636	-0.04750	0.00197	-0.61535	0.03422	0.00357	-0.09077
SUM10	0.82153	0.23212	0.66883	0.54265	0.48927	-0.00610	-0.00807	-0.54994	0.10403	-0.01693	-0.11373
E3NMIN	-0.25224	-0.61032	0.38955	0.10561	0.52060	-0.20284	-0.00635	-0.16485	0.57646	0.10038	0.05965
T3TQ	-0.01806	-0.22269	0.15842	0.19110	0.06290	0.49898	-0.04198	-0.07518	0.27962	0.13609	0.18331
E3UO	0.43225	0.32315	0.51766	0.43729	0.44546	-0.08862	0.08763	-0.02906	0.32803	0.10999	-0.00573
E3IDM	0.64689	0.36688	0.30829	0.21601	0.15667	-0.05756	-0.07355	-0.52865	-0.01171	-0.03286	-0.09888
E3TLDM	0.40002	-0.56647	0.45296	0.12882	0.31163	0.22034	-0.19454	-0.74075	-0.04140	-0.17296	-0.12040
E3IIP	-0.07189	0.33348	-0.29744	0.64048	-0.29222	-0.30923	0.49072	0.22686	-0.05134	0.07104	-0.01519
E3SC	0.58065	0.51750	0.28575	0.04402	0.12448	0.05054	-0.14649	-0.38087	-0.20775	-0.14120	-0.19831
E3UPA	1.00000	0.14165	0.52214	0.37113	0.25133	0.53914	-0.08430	-0.67458	-0.22031	-0.10206	-0.52649
E3CGO	0.14165	1.00000	-0.30109	-0.18844	-0.36305	-0.04122	0.07559	0.28098	-0.49841	0.00744	-0.05045
E3TUC	0.52214	-0.30109	1.00000	0.20895	0.77115	0.17883	-0.23219	-0.55035	0.49890	0.06206	0.01963
E3CIP	0.37113	-0.18844	0.20895	1.00000	0.18846	-0.20258	0.37421	-0.20810	0.20792	-0.04460	-0.10178
E3USE	0.25133	-0.36305	0.77115	0.18846	1.00000	-0.02746	-0.23552	-0.33901	0.53405	0.15050	0.06257
T3AGE	0.13914	-0.04122	0.17883	-0.20258	-0.02746	1.00000	-0.12391	-0.05010	-0.08859	-0.03238	0.02753
T3TSB	-0.08430	0.07559	-0.23219	0.37421	-0.23552	-0.12391	1.00000	0.31137	-0.11014	-0.08811	-0.13236
PCT72	-0.67458	0.28093	-0.55035	-0.20810	-0.33901	-0.05010	0.31137	1.00000	-0.05678	0.06833	0.05544
PCT73	-0.22031	-0.49841	0.49890	0.29792	0.53405	-0.08859	-0.11014	-0.05678	1.00000	0.22369	0.21256
LTOT72	-0.10206	0.00744	0.06206	-0.04460	0.15050	-0.03238	-0.08811	0.06833	0.22369	1.00000	0.79945
LTOT73	-0.12649	-0.05045	0.01963	-0.10178	0.06257	0.02753	-0.13236	0.05544	0.21256	0.79945	1.00000

TABLE V-I-22

Intercorrelations among the Key Analysis Variables -- Cohort 4, Spring 1972, Language Total Score Analysis

[r (p<.05) = .404 , k_{eff} = 24]

	RESL72	COMPSES	RESL71	SUM04	SUM10	E2NMIN	T2TQ	E2UO	E2IDM	E2TLDM	E2IIP	E2SC
RESL72	1.00000	0.33996	0.82445	0.04980	0.01430	0.01966	0.11050	0.04920	-0.01581	-0.02292	0.03491	-0.08596
COMPSES	0.33996	1.00000	0.28299	0.19117	0.20716	0.07325	-0.06157	0.29178	-0.00874	0.07150	0.24827	0.05693
RESL71	0.82445	0.28299	1.00000	0.07631	0.02877	0.00269	0.10092	0.04004	0.01535	-0.04671	0.05504	-0.04543
SUM04	0.04980	0.19117	0.07631	1.00000	0.93883	0.08317	0.02705	0.69863	0.69514	0.59604	0.80599	0.47243
SUM10	0.01430	0.20716	0.02877	0.97883	1.00000	0.13982	-0.08698	0.82519	0.66171	0.65646	0.73237	0.60753
E2NMIN	0.01966	0.07325	0.00269	0.08317	0.13982	1.00000	-0.07672	0.30035	-0.13392	0.12005	0.27379	0.16617
T2TQ	0.11050	-0.06157	0.10092	0.02705	-0.08698	-0.07672	1.00000	-0.23575	0.10124	0.06950	0.02148	-0.27991
E2UO	0.04920	0.29178	0.04004	0.69863	0.82519	0.30035	-0.23575	1.00000	0.40803	0.42911	0.61177	0.50785
E2IDM	-0.01581	-0.00874	0.01535	0.69514	0.66171	-0.13396	0.10124	0.40803	1.00000	0.50599	0.39143	0.45084
E2TLDM	-0.02292	0.07150	-0.04671	0.59604	0.65646	0.12005	0.06950	0.42911	0.50599	1.00000	0.39450	0.40103
E2IIP	0.03491	0.24827	0.05504	0.80594	0.73237	0.27379	0.02148	0.61177	0.39143	0.39450	1.00000	0.26187
E2SC	-0.08596	0.05693	-0.04543	0.47243	0.60753	0.16617	-0.27991	0.50785	0.45084	0.40103	0.26187	1.00000
E2UPA	0.02147	0.07559	0.06478	0.72990	0.63887	-0.20860	-0.08165	0.34666	0.78739	0.31693	0.43128	0.41038
E2CGO	-0.04609	-0.00068	-0.01419	0.53449	0.62707	0.05147	-0.14062	0.48523	0.46140	0.31620	0.40292	0.30606
E2TUC	0.00159	0.08457	-0.00739	0.50583	0.61891	-0.14075	-0.00210	0.36857	0.41355	0.29351	0.26663	0.23262
E2CIP	0.04915	0.31154	0.03963	0.61198	0.62974	0.17716	0.00716	0.60726	0.20842	0.35815	0.64806	0.27562
E2USE	0.09363	0.21697	0.08442	0.81170	0.82608	0.25131	0.06776	0.73003	0.51054	0.62576	0.56792	0.35758
T2AGE	0.07335	-0.03276	0.05269	-0.01610	-0.08951	0.04778	0.64646	-0.22967	-0.03150	-0.00704	0.02564	-0.23144
T2TSB	0.04247	0.20808	-0.00620	0.04429	0.15387	0.07608	-0.45521	0.31428	-0.10725	0.16210	0.04351	0.19385
PCT71	0.03809	-0.04205	0.00004	-0.36272	-0.28485	0.01962	-0.09888	-0.05264	-0.40964	-0.17725	-0.14168	-0.30831
PCT72	0.00000	-0.07451	-0.00196	-0.18655	-0.13230	0.23610	-0.19556	0.10781	-0.26148	-0.31361	0.03403	-0.15371
LTOT71	0.82507	0.27927	0.99746	0.05027	0.00840	0.00408	0.09361	0.03618	-0.01389	-0.05923	0.04480	-0.06729
LTOT72	0.99999	0.33958	0.82443	0.04886	0.01363	0.02086	0.10950	0.04975	-0.01714	-0.02451	0.03509	-0.08674

	E2UPA	E2CGO	E2TUC	E2CIP	E2USE	T2AGE	T2TSB	PCT71	PCT72	LTOT71	LTOT72
RESL72	0.02147	-0.04609	0.00159	0.04915	0.09363	0.07335	0.04247	0.03809	0.00000	0.82507	0.99999
COMPSES	0.07559	-0.00068	0.03457	0.31154	0.21697	-0.03276	0.20808	-0.04205	-0.07451	0.27927	0.33958
RESL71	0.06478	-0.01419	-0.00739	0.03963	0.08442	0.05269	-0.00620	0.00004	-0.00196	0.99746	0.82443
SUM04	0.72990	0.53449	0.50583	0.61198	0.81170	-0.01610	0.04429	-0.36272	-0.18655	0.05027	0.04886
SUM10	0.63887	0.62707	0.61891	0.62974	0.82608	-0.08951	0.15387	-0.28485	-0.13230	0.00840	0.01363
E2NMIN	-0.20860	0.05147	-0.14075	0.17716	0.25131	0.04778	0.07608	0.01962	0.23610	0.00408	0.02086
T2TQ	-0.08185	-0.14062	-0.00210	0.00716	0.06776	0.64646	-0.45521	-0.09888	-0.19556	0.09361	0.10950
E2UO	0.34666	0.48523	0.36857	0.60726	0.73003	-0.22967	0.31428	-0.05264	0.10781	0.03618	0.04975
E2IDM	0.38739	0.46140	0.41355	0.20842	0.51054	-0.03150	-0.10725	-0.40964	-0.26148	-0.01389	-0.01714
E2TLDM	0.31693	0.31620	0.29351	0.35815	0.62576	-0.00704	0.16210	-0.17725	-0.31361	-0.05923	-0.02451
E2IIP	0.43126	0.40292	0.26663	0.64806	0.56792	0.02564	0.04351	-0.14168	0.03403	0.04480	0.03509
E2SC	0.41038	0.30606	0.23262	0.27562	0.35758	-0.23144	0.19385	-0.30831	-0.15371	-0.06729	-0.08674
E2UPA	1.00000	0.41313	0.34866	0.37053	0.36987	0.00602	0.02434	-0.47653	-0.33013	0.03065	0.01980
E2CGO	0.41313	1.00000	0.43479	-0.02120	0.37985	0.00220	-0.00202	-0.15563	-0.01874	-0.02525	-0.04619
E2TUC	0.34866	0.43479	1.00000	0.28486	0.53164	-0.02588	0.04535	-0.09114	-0.07400	-0.01387	0.00121
E2CIP	0.37053	-0.02120	0.28486	1.00000	0.55942	-0.01430	0.15742	-0.14239	-0.00142	0.02938	0.04915
E2USE	0.36987	0.37985	0.53164	0.55942	1.00000	-0.05595	0.12655	-0.13343	-0.05885	0.07469	0.09333
T2AGE	0.00602	0.00220	-0.02588	-0.01430	-0.05595	1.00000	-0.42402	-0.03874	0.04278	0.04979	0.07357
T2TSB	0.02494	-0.00202	0.04535	0.15742	0.12655	-0.42402	1.00000	0.13019	0.02430	0.00310	0.04259
PCT71	-0.47653	-0.15563	-0.09114	-0.14239	-0.13343	-0.03874	0.13019	1.00000	0.71383	0.07131	0.04171
PCT72	-0.33013	-0.01874	-0.07400	-0.00142	-0.05885	0.04278	0.02434	0.71383	1.00000	0.04892	0.00508
LTOT71	0.03065	-0.02525	-0.01387	0.02938	0.07469	0.04979	0.00510	0.07131	0.04392	1.00000	0.82531
LTOT72	0.01980	-0.04619	0.00121	0.04915	0.09333	0.07357	0.04259	0.04171	0.00508	0.82531	1.00000

TABLE V-I-23

Intercorrelations among the Key Analysis Variables -- Cohort 4, Spring 1973, Language Total Score Analysis

[r (p<.05) = .404 , k_{eff} = 24]

	RESL73	COMPSES	RESL72	SUM04	SUM10	E3NMIN	T3TQ	E3UO	E3IDM	E3TLDM	E3IIP	E3SC
RESL73	1.00000	0.29457	0.83565	-0.05301	-0.12268	0.00101	0.01884	-0.03223	-0.04294	-0.12032	-0.08662	-0.12535
COMPSES	0.29457	1.00000	0.30773	-0.05607	-0.08114	-0.09691	-0.07193	0.16470	-0.08006	-0.16813	-0.07489	-0.10701
RESL72	0.83565	0.30773	1.00000	-0.08586	-0.13702	-0.06414	0.04155	-0.02134	-0.04977	-0.09304	-0.08814	-0.14899
SUM04	-0.05301	-0.05607	-0.08586	1.00000	0.89459	-0.11541	-0.11311	0.60146	0.48023	0.30704	0.74090	0.44853
SUM10	-0.12268	-0.08114	-0.13702	0.89459	1.00000	-0.22248	-0.11054	0.74966	0.43609	0.47328	0.79006	0.62771
E3NMIN	0.00101	-0.09691	-0.06414	-0.11541	-0.22248	1.00000	0.03235	-0.29657	-0.17090	-0.17469	-0.04888	-0.30464
T3TQ	0.01884	-0.07193	0.04155	-0.11311	-0.11054	0.03235	1.00000	-0.05526	-0.18127	0.18351	0.07135	-0.31796
E3UO	-0.03223	0.16470	-0.02134	0.60146	0.74966	-0.29657	-0.05526	1.00000	0.17456	0.18321	0.57747	0.34174
E3IDM	-0.04294	-0.08006	-0.04977	0.48023	0.43609	-0.17090	-0.18127	0.17450	1.00000	-0.01790	0.16761	0.55728
E3TLDM	-0.12032	-0.16813	-0.09304	0.30704	0.47328	-0.17469	0.18351	0.18321	-0.01790	1.00000	0.46771	0.22065
E3IIP	-0.08662	-0.07489	-0.08814	0.74090	0.79006	-0.04888	0.07135	0.57747	0.16761	0.46771	1.00000	0.23807
E3SC	-0.12535	-0.10701	-0.14899	0.44853	0.62771	-0.30464	-0.31796	0.34174	0.55728	0.22065	0.23807	1.00000
E3UPA	0.04743	0.08763	-0.01608	0.73781	0.50644	-0.11853	-0.26891	0.27949	0.33095	-0.02479	0.24195	0.25096
E3CGO	-0.11293	-0.22420	-0.18184	0.54145	0.56585	0.22997	-0.16236	0.28759	0.47266	-0.00419	0.42379	0.45955
E3TUC	-0.12747	-0.00853	-0.08912	0.21215	0.49641	-0.42200	-0.05925	0.47972	-0.04784	0.26720	0.28969	0.34238
E3CIP	-0.06718	-0.03027	-0.05011	0.55031	0.60979	0.04094	0.09669	0.42022	0.19162	0.40041	0.76752	0.11330
E3USE	-0.08606	-0.14095	-0.08242	0.57720	0.57910	0.03140	0.11924	0.51931	-0.07595	0.38303	0.46046	0.22105
T3AGE	0.05338	-0.11811	0.05428	-0.09342	-0.00782	-0.01836	0.60665	0.07336	-0.27663	0.15548	0.12981	-0.25492
T3TSB	0.08253	0.32946	0.08907	-0.04866	0.00039	-0.13154	-0.14622	0.12522	0.00052	0.17369	0.01622	0.00360
PCT72	-0.05468	-0.08607	0.00000	-0.22013	-0.11517	0.03783	0.11155	0.06569	-0.11242	-0.13321	0.08577	-0.25005
PCT73	0.00001	0.18070	0.05730	-0.07357	0.01376	-0.15767	0.03873	0.21056	-0.02686	-0.16255	0.07910	-0.15697
LTOT72	0.83514	0.30697	0.99996	-0.08777	-0.13802	-0.06381	0.04252	-0.02077	-0.05074	-0.09419	-0.08739	-0.15116
LTOT73	0.99986	0.29753	0.83648	-0.05422	-0.12244	-0.00161	0.01949	-0.02873	-0.04338	-0.12300	-0.08530	-0.12795

	E3UPA	E3CGO	E3TUC	E3CIP	E3USE	T3AGE	T3TSB	PCT72	PCT73	LTOT72	LTOT73
RESL73	0.04743	-0.11293	-0.12747	-0.06718	-0.08606	0.05338	0.08253	-0.05468	0.00001	0.83514	0.99986
COMPSES	0.08763	-0.22420	-0.00853	-0.03027	-0.14095	-0.11811	0.32946	-0.08607	0.18070	0.30697	0.29753
RESL72	-0.01608	-0.18184	-0.08912	-0.05011	-0.08242	0.05428	0.08907	0.00000	0.05730	0.99996	0.83648
SUM04	0.73781	0.54145	0.21215	0.55031	0.57720	-0.09342	-0.04866	-0.22013	-0.07357	-0.08777	-0.05422
SUM10	0.50644	0.56585	0.49641	0.60979	0.57910	-0.00782	0.00039	-0.11517	0.01376	-0.13802	-0.12244
E3NMIN	-0.11853	0.22997	-0.42200	0.04094	0.03140	-0.01836	-0.13154	0.03783	-0.15767	-0.06381	-0.00161
T3TQ	-0.26891	-0.16236	-0.05925	0.09669	0.11924	0.60665	-0.14622	0.11155	0.03873	0.04252	0.01949
E3UO	0.27949	0.28759	0.47972	0.42022	0.51931	0.07336	0.12522	0.06569	0.21056	-0.02077	-0.02873
E3IDM	0.33095	0.47268	-0.04784	0.19162	-0.07595	-0.27663	0.00052	-0.11242	-0.02686	-0.05074	-0.04338
E3TLDM	-0.02479	-0.00419	0.26720	0.40041	0.38303	0.15548	0.17369	-0.13321	-0.16255	-0.09419	-0.12300
E3IIP	0.24195	0.42379	0.28969	0.76752	0.46046	0.12981	0.01622	0.08577	0.07910	-0.08739	-0.08530
E3SC	0.25096	0.45955	0.34238	0.11330	0.22105	-0.25492	0.00360	-0.25005	-0.15697	-0.15116	-0.12795
E3UPA	1.00000	0.36347	-0.01039	0.19074	0.14897	-0.18782	-0.13313	-0.30486	-0.07905	-0.01873	0.04611
E3CGO	0.36347	1.00000	-0.02413	0.17524	0.16318	-0.06773	-0.23465	0.06856	-0.11817	-0.18124	-0.11488
E3TUC	-0.01039	-0.02413	1.00000	0.17463	0.32685	0.16602	0.04298	0.00152	0.25602	-0.08910	-0.12319
E3CIP	0.19074	0.17524	0.17463	1.00000	0.23819	0.12291	0.00712	0.14159	0.21057	-0.04887	-0.06367
E3USE	0.14897	0.16318	0.32685	0.23819	1.00000	0.05915	0.03196	-0.22755	-0.18464	-0.08439	-0.08912
T3AGE	-0.18782	-0.06773	0.16602	0.12291	0.05915	1.00000	-0.20106	0.33365	0.18261	0.05718	0.05641
T3TSB	-0.13313	-0.23465	0.04298	0.00712	0.03196	-0.20106	1.00000	-0.04734	0.07193	0.08866	0.08371
PCT72	-0.30486	0.06856	0.00152	0.14159	-0.22755	0.33365	-0.04734	1.00000	0.68951	0.00870	-0.04321
PCT73	-0.07905	-0.11817	0.25602	0.21057	-0.18464	0.18261	0.07193	0.68951	1.00000	0.06329	0.01664
LTOT72	-0.01873	-0.18124	-0.08910	-0.04887	-0.08439	0.05718	0.08866	0.00870	0.06329	1.00000	0.83606
LTOT73	0.04611	-0.11488	-0.12319	-0.06367	-0.08912	0.05641	0.08371	-0.04321	0.01664	0.83608	1.00000

TABLE V-I-24

Intercorrelations among the Key Analysis Variables -- Cohort 6, Spring 1972, Language Total Score Analysis

[r (p<.05) = .707 , k_{eff} = 8]

	RESL72	COMPSES	RESL71	SUM04	SUM10	E2NMIN	T2TQ	E2UO	E2IDM	E2TLDM	E2IIP	E2SC
RESL72	1.00000	0.24444	0.79918	0.11299	0.11111	-0.08329	-0.12623	0.10468	0.07269	0.06824	0.04378	0.12607
COMPSES	0.24444	1.00000	0.22393	0.17494	0.19204	-0.27591	-0.25664	0.19477	0.09122	0.00439	0.03388	0.34619
RESL71	0.79918	0.22393	1.00000	0.10789	0.10915	-0.13312	-0.14944	0.10149	0.03550	0.08160	0.02687	0.14363
SUM04	0.11299	0.17494	0.10789	1.00000	0.97616	0.15916	-0.06218	0.84318	0.56703	0.77262	0.85347	0.65012
SUM10	0.11111	0.19204	0.10915	0.97616	1.00000	0.13858	-0.08201	0.90592	0.55447	0.83467	0.82152	0.75224
E2NMIN	-0.08329	-0.27591	-0.13312	0.15916	0.13858	1.00000	0.43395	0.07801	0.42961	0.13144	0.35793	-0.11091
T2TQ	-0.12623	-0.25664	-0.14944	-0.06218	-0.08201	0.43395	1.00000	-0.03387	0.05571	0.02426	-0.03963	-0.17203
E2UO	0.10468	0.19477	0.10149	0.84318	0.90592	0.07801	-0.03587	1.00000	0.44800	0.72427	0.66572	0.74625
E2IDM	0.07269	0.09122	0.03550	0.56703	0.55447	0.42961	0.05571	0.44800	1.00000	0.44869	0.31621	0.41961
E2TLDM	0.06824	0.00439	0.08160	0.77262	0.83467	0.13144	0.02426	0.72427	0.44869	1.00000	0.63465	0.58011
E2IIP	0.04378	0.03388	0.02687	0.85347	0.82152	0.35793	-0.03923	0.66572	0.31621	0.63465	1.00000	0.33623
E2SC	0.12607	0.34619	0.14363	0.65012	0.75224	-0.11091	-0.17203	0.74625	0.41961	0.58011	0.33623	1.00000
E2UPA	0.12379	0.12882	0.15730	0.61511	0.52985	-0.36968	-0.04104	0.40901	0.19761	0.53351	0.29955	0.32511
E2CGO	0.10295	0.33263	0.13917	0.34341	0.43518	-0.66268	-0.45111	0.36094	-0.07948	0.43256	0.21519	0.53458
E2TUC	-0.01534	-0.13859	-0.05321	0.65113	0.57876	0.61048	0.10228	0.37237	0.43255	0.48076	0.87787	-0.01946
E2CIP	0.09348	0.14932	0.07334	0.95132	0.93906	0.36408	0.01257	0.86842	0.62978	0.67131	0.84540	0.64727
E2USE	0.10455	0.26048	0.09572	0.88505	0.93667	0.17218	-0.10475	0.90984	0.52682	0.65494	0.73570	0.84748
T2AGE	-0.10418	-0.09545	-0.09742	-0.11440	-0.08679	0.10628	0.77060	-0.00894	0.03673	-0.00536	-0.17744	0.01413
T2TSB	0.05273	0.16726	0.08902	-0.32386	-0.23408	-0.39442	-0.31742	-0.23418	-0.45164	-0.04990	-0.29231	0.04452
PCT71	-0.01209	0.07905	0.00164	0.47034	0.54144	0.19801	0.02801	0.55247	0.22811	0.34012	0.34491	0.72426
PCT72	0.00173	-0.00492	-0.00444	0.46629	0.48227	0.57678	0.15117	0.29135	0.55078	0.40077	0.36147	0.56468
LTOT71	0.79816	0.21788	0.99755	0.07477	0.07106	-0.14665	-0.15105	0.06264	0.01947	0.05764	0.00271	0.09268
LTOT72	0.99999	0.24446	0.79919	0.11127	0.10933	-0.08541	-0.12679	0.10361	0.07065	0.06676	0.04245	0.12398

	E2UPA	E2CGO	E2TUC	E2CIP	E2USE	T2AGE	T2TSB	PCT71	PCT72	LTOT71	LTOT72
RESL72	0.12379	0.10295	-0.01534	0.09348	0.10455	-0.10418	0.05273	-0.01209	0.00173	0.79816	0.99999
COMPSES	0.12882	0.33263	-0.13859	0.14932	0.26048	-0.09545	0.16726	0.07905	-0.00432	0.21788	0.24446
RESL71	0.15730	0.13917	-0.05321	0.07334	0.09572	-0.09742	0.08902	0.00164	-0.00444	0.99755	0.79919
SUM04	0.61511	0.34341	0.65113	0.95132	0.88505	-0.11440	-0.32386	0.47034	0.46629	0.07477	0.11127
SUM10	0.52985	0.43518	0.57876	0.93906	0.93667	-0.08679	-0.23408	0.54144	0.48227	0.07106	0.10933
E2NMIN	-0.36968	-0.66288	0.61048	0.36408	0.17218	0.10628	-0.39442	0.19801	0.57678	-0.14665	-0.08541
T2TQ	-0.04104	-0.45111	0.10228	0.01257	-0.10475	0.77060	-0.31742	0.02801	0.15117	-0.15105	-0.12679
E2UO	0.40901	0.36094	0.37237	0.86842	0.90984	-0.00894	-0.23418	0.55247	0.29135	0.06264	0.10361
E2IDM	0.19761	-0.07948	0.43255	0.62978	0.52682	0.03673	-0.45164	0.22811	0.55078	0.01947	0.07065
E2TLDM	0.53351	0.43256	0.48076	0.67131	0.65494	-0.00536	-0.04990	0.34012	0.40077	0.05764	0.06676
E2IIP	0.29955	0.21519	0.87787	0.84540	0.73570	-0.17744	-0.29231	0.34491	0.36147	0.00271	0.04245
E2SC	0.32511	0.53458	-0.01946	0.64727	0.84748	0.01413	0.04452	0.72426	0.56468	0.09268	0.12398
E2UPA	1.00000	0.34481	0.12200	0.40249	0.30549	-0.06254	-0.11780	0.03431	0.03068	0.15454	0.12368
E2CGO	0.34481	1.00000	-0.05991	0.14085	0.38352	-0.15813	0.43159	0.11387	-0.15696	0.13089	0.10353
E2TUC	0.12200	-0.09991	1.00000	0.67425	0.45393	-0.15028	-0.42786	0.11451	0.34427	-0.06109	-0.01661
E2CIP	0.40249	0.14085	0.67425	1.00000	0.92741	-0.07115	-0.42175	0.56848	0.56277	0.03344	0.09140
E2USE	0.30549	0.38352	0.45333	0.92741	1.00000	-0.06668	-0.22934	0.71172	0.55358	0.04575	0.10251
T2AGE	-0.06254	-0.15813	-0.15028	-0.07115	-0.06668	1.00000	-0.04503	0.02928	0.05513	-0.09924	-0.10438
T2TSB	-0.11780	0.43159	-0.42786	-0.42175	-0.22934	-0.04503	1.00000	-0.28162	-0.27492	0.10850	0.05375
PCT71	0.03431	0.11387	0.11451	0.56848	0.71172	0.02928	-0.28162	1.00000	0.71859	-0.06825	-0.01474
PCT72	0.03068	-0.15696	0.34427	0.56277	0.55358	0.05513	-0.27492	0.71859	1.00000	-0.05465	-0.00196
LTOT71	0.15454	0.13089	-0.06109	0.03344	0.04575	-0.09924	0.10850	-0.06825	-0.05455	1.00000	0.79836
LTOT72	0.12368	0.10353	-0.01661	0.09140	0.10251	-0.10438	0.05375	-0.01474	-0.00196	0.79836	1.00000

TABLE V-I-25

Intercorrelations among the Key Analysis Variables -- Cohort 6, Spring 1973, Language Total Score Analysis

[r (p< .05) = .754 , k_{eff} = 7]

	RESL73	COMPSES	RESL72	SUM04	SUM10	E3NMIN	T3TQ	E3UO	E3IDM	E3TLDM	E3IIP	E3SC
RESL73	1.00000	0.25815	0.81952	0.03102	0.02295	-0.14664	-0.04629	0.04942	0.04326	-0.05410	-0.05724	0.10100
COMPSES	0.25815	1.00000	0.26333	0.28978	0.25279	-0.36317	-0.20499	0.28976	0.17621	-0.06356	0.05879	0.36307
RESL72	0.81952	0.26333	1.00000	0.07802	0.06618	-0.09221	-0.04800	0.08584	0.10595	-0.03907	-0.01128	0.08997
SUM04	0.03102	0.28978	0.07802	1.00000	0.96103	0.01425	-0.18748	0.90961	0.70734	0.43426	0.85113	0.73083
SUM10	0.02295	0.25279	0.06618	0.96103	1.00000	-0.03997	-0.07284	0.96419	0.68662	0.59634	0.83717	0.78013
E3NMIN	-0.14664	-0.36317	-0.09221	0.01425	-0.03997	1.00000	0.23977	-0.17377	0.24178	0.04245	0.30501	-0.53503
T3TQ	-0.04629	-0.20499	-0.04800	-0.18748	-0.07284	0.23977	1.00000	-0.11799	0.21872	0.14467	-0.10186	-0.26712
E3UO	0.04942	0.28976	0.08584	0.90961	0.96419	-0.17377	-0.11799	1.00000	0.62261	0.53048	0.75614	0.85294
E3IDM	0.04326	0.17621	0.10595	0.70734	0.68662	0.24178	0.21872	0.62261	1.00000	0.26111	0.53590	0.35957
E3TLDM	-0.05410	-0.06356	-0.03907	0.43426	0.59634	0.04245	0.14467	0.53048	0.26111	1.00000	0.51061	0.35130
E3IIP	-0.05724	0.05879	-0.01128	0.85113	0.83717	0.30501	-0.10186	0.75614	0.53590	0.51061	1.00000	0.55137
E3SC	0.10100	0.36307	0.08997	0.73083	0.78013	-0.53503	-0.26712	0.85294	0.35957	0.35130	0.55137	1.00000
E3UPA	0.04768	0.35489	0.07714	0.60131	0.53356	-0.28919	-0.17590	0.46898	0.28254	0.14889	0.27788	0.33430
E3CGO	0.02368	0.04501	0.01646	-0.03600	0.14402	-0.27419	0.50134	0.10810	0.21157	0.22810	-0.10371	0.15435
E3TUC	-0.03780	0.08233	0.03559	0.76089	0.78543	0.40781	0.12956	0.72498	0.70628	0.30188	0.72398	0.37710
E3CIP	-0.01917	0.15831	0.02946	0.89436	0.92926	0.08843	-0.07271	0.85720	0.58817	0.74614	0.83798	0.59115
E3USE	0.05976	0.23592	0.07960	0.81814	0.80952	-0.04977	-0.28997	0.84310	0.56141	0.36228	0.71390	0.82520
T3AGE	-0.09429	-0.17775	-0.09422	-0.05305	0.00066	0.18760	0.61005	-0.02845	0.07587	0.19826	0.09646	-0.06719
T3TSB	0.03393	0.08128	0.03653	0.05777	0.11077	-0.19631	-0.21999	0.16128	0.17266	0.07176	0.05526	0.26552
PCT72	-0.04953	-0.01551	-0.00000	0.61611	0.67298	0.30235	-0.00828	0.55135	0.49619	0.81446	0.61578	0.30453
PCT73	0.00000	0.24102	0.07815	0.88188	0.82440	0.21714	-0.17121	0.73238	0.70006	0.31091	0.71422	0.44427
LTOT72	0.81912	0.26320	0.99997	0.08275	0.07135	-0.08989	-0.04806	0.09007	0.10976	-0.03281	-0.00655	0.09231
LTOT73	0.98927	0.29059	0.82215	0.15951	0.14314	-0.11335	-0.07081	0.15588	0.14506	-0.00810	0.04771	0.16482

	E3UPA	E3CGO	E3TUC	E3CIP	E3USE	T3AGE	T3TSB	PCT72	PCT73	LTOT72	LTOT73
RESL73	0.04768	0.02368	-0.03780	-0.01917	0.05976	-0.09429	0.03393	-0.04953	0.00000	0.81912	0.98927
COMPSES	0.35489	0.04501	0.08233	0.15831	0.23592	-0.17775	0.08128	-0.01551	0.24102	0.26320	0.29059
RESL72	0.07714	0.01646	0.03559	0.02946	0.07960	-0.09422	0.03653	-0.00000	0.07815	0.99997	0.82215
SUM04	0.60131	-0.03600	0.76089	0.89436	0.81814	-0.05305	0.05777	0.61611	0.88188	0.08275	0.15951
SUM10	0.53356	0.14402	0.78543	0.92926	0.80952	0.00066	0.11077	0.67298	0.82440	0.07135	0.14314
E3NMIN	-0.28919	-0.27419	0.40781	0.08843	-0.04977	0.18760	-0.19631	0.30235	0.21714	-0.08989	-0.11335
T3TQ	-0.17590	0.50134	0.12956	-0.07271	-0.28997	0.61005	-0.21999	-0.00828	-0.17121	-0.04806	-0.07081
E3UO	0.46898	0.10810	0.72498	0.85720	0.84310	-0.02845	0.16128	0.55135	0.73238	0.09007	0.15588
E3IDM	0.28254	0.21157	0.70628	0.58817	0.56141	0.07587	0.17266	0.49619	0.70006	0.10976	0.14506
E3TLDM	0.14889	0.22810	0.30188	0.74614	0.36228	0.19826	0.07176	0.81446	0.31091	-0.03281	-0.00810
E3IIP	0.27788	-0.10371	0.72398	0.83798	0.71390	0.09646	0.05526	0.61578	0.71422	-0.00655	0.04771
E3SC	0.33430	0.15435	0.37710	0.59115	0.82520	-0.06719	0.26552	0.30453	0.44427	0.09631	0.16482
E3UPA	1.00000	0.07872	0.35790	0.55321	0.13912	-0.21717	-0.18156	0.20729	0.62133	0.07873	0.13793
E3CGO	0.07872	1.00000	0.11899	-0.00628	-0.16334	0.13351	0.27869	0.01550	-0.06330	0.01658	0.01418
E3TUC	0.35790	0.11899	1.00000	0.70058	0.58222	0.01336	-0.04217	0.52327	0.83803	0.03961	0.08503
E3CIP	0.55321	-0.00628	0.70058	1.00000	0.67031	0.02417	-0.00151	0.78085	0.79820	0.03546	0.09764
E3USE	0.13912	-0.16334	0.58222	0.67031	1.00000	-0.03409	0.19395	0.55731	0.63303	0.08388	0.15159
T3AGE	-0.21717	0.13351	0.01336	0.02417	-0.03409	1.00000	0.06403	0.07758	-0.15776	-0.09363	-0.11633
T3TSB	-0.18156	0.27869	-0.04217	-0.00151	0.19395	0.06403	1.00000	-0.01798	-0.06452	0.03639	0.02414
PCT72	0.20729	0.01550	0.52327	0.78085	0.55731	0.07758	-0.01798	1.00000	0.65116	0.00768	0.04612
PCT73	0.62133	-0.06330	0.83803	0.79820	0.63303	-0.15776	-0.06452	0.65116	1.00000	0.08315	0.14608
LTOT72	0.07873	0.01658	0.03961	0.03546	0.08388	-0.09363	0.03639	0.00768	0.08315	1.00000	0.82248
LTOT73	0.13793	0.01418	0.08503	0.09764	0.15159	-0.11633	0.02414	0.04612	0.14608	0.82248	1.00000

TABLE V-I-26

Commonality Coefficients*for the Regression of Posttest on SES (S), Pretest (P), EdExAG Dummy Codes (D) and Teacher Variables (T) -- Cohort 1, Spring 1972, Language Total Score Analysis

	SES(S)	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.03468 (.10446)	.09476 (.28547)	.09259 (.27895)	.01072 (.03229)
C(S,P)	.03846 (.11586)	.03846 (.11586)		
C(S,D)	.06841 (.20610)		.06841 (.20610)	
C(S,T)	.00051 (.00154)			.00051 (.00154)
C(P,D)		.00254 (.00765)	.00254 (.00765)	
C(P,T)		.00026 (.00080)		.00026 (.00080)
C(D,T)			-.00727 (-.02191)	-.00727 (-.02191)
C(S,P,D)	.00007 (.00021)	.00007 (.00021)	.00007 (.00021)	
C(S,P,T)	.00063 (.00191)	.00063 (.00191)		.00063 (.00191)
C(S,D,T)	-.00368 (-.01109)		-.00368 (-.01109)	-.00368 (-.01109)
C(P,D,T)		.00123 (.00372)	.00123 (.00372)	.00123 (.00372)
C(S,P,D,T)	-.00198 (-.00597)	-.00198 (-.00597)	-.00198 (-.00597)	-.00198 (-.00597)
$R^2(X_i)$	.13710	.13598	.15192	.00043

$R^2(S,P,D,T) = .33194$

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* Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,D,T)$

TABLE V-I-27

Commonality Coefficients* for the Regression of Posttest on SES (S), Pretest (P), EdExAG Dummy Codes (D) and Teacher Variables (T) -- Cohort 1, Spring 1973, Language Total Score Analysis

	SES(S)	Pretest (P)	EdExAG Dummy Codes (D)	Teacher Variables (T)
$U(X_i)$	.00337 (.00497)	.46384 (.68468)	.08076 (.11921)	.00178 (.00263)
C(S,P)	.05497 (.08114)	.05497 (.08114)		
C(S,D)	.00015 (.00022)		.00015 (.00022)	
C(S,T)	-.00017 (-.00026)			-.00017 (-.00026)
C(P,D)		.05776 (.08526)	.05776 (.08526)	
C(P,T)		.00828 (.01222)		.00828 (.01222)
C(D,T)			.00248 (.00366)	.00248 (.00366)
C(S,P,D)	-.01172 (-.01730)	-.01172 (-.01730)	-.01172 (-.01730)	
C(S,P,T)	-.00132 (-.00195)	-.00132 (-.00195)		-.00132 (-.00195)
C(S,D,T)	.00148 (.00219)		.00148 (.00219)	.00148 (.00219)
C(P,D,T)		.00878 (.01295)	.00878 (.01295)	.00878 (.01295)
C(S,P,D,T)	.00702 (.01036)	.00702 (.01036)	.00702 (.01036)	.00702 (.01036)
$R^2(X_i)$	.05377	.58761	.14671	.02833

$R^2(S,P,D,T)$ = .67746

* Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,D,T)$.

TABLE V-I-28

Commonality Coefficients* for the Regression of Posttest on SES (S), Pretest (P), EdExAG Dummy Codes (D) and Teacher Variables (T) -- Cohort 4, Spring 1972, Language Total Score Analysis

	SES(S)	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_1)$	.00241 (.00334)	.48952 (.67966)	.02403 (.03336)	.00269 (.00373)
C(S,P)	.04130 (.05734)	.04130 (.05734)		
C(S,D)	.00789 (.01096)		.00789 (.01096)	
C(S,T)	.00006 (.00008)			.00006 (.00008)
C(P,D)		.07254 (.10072)	.07254 (.10072)	
C(P,T)		.01865 (.02589)		.01865 (.02589)
C(D,T)			.00144 (.00199)	.00144 (.00199)
C(S,P,D)	.05896 (.08186)	.05896 (.08186)	.05896 (.08186)	
C(S,P,T)	.00238 (.00330)	.00238 (.00330)		.00238 (.00330)
C(S,D,T)	.00201 (.00279)		.00201 (.00279)	.00201 (.00279)
C(P,D,T)		-.00420 (-.00583)	-.00420 (-.00583)	-.00420 (-.00583)
C(S,P,D,T)	.00057 (.00080)	.00057 (.00080)	.00057 (.00080)	.00057 (.00080)
$R^2(X_1)$	.11558	.67972	.16324	.02359

R^2(S,P,D,T) = .72024

*Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by R^2(S,P,D,T).

TABLE V-I-29

Commonality Coefficients* for the Regression of Posttest on SES (S), Pretest (P), EdExAG Dummy Codes (D) and Teacher Variables (T) -- Cohort 4, Spring 1973, Language Total Score Analysis

	SES(S)	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.00191 (.00260)	.54863 (.74560)	.03510 (.04770)	.00152 (.00206)
C(S,P)	.03877 (.05269)	.03877 (.05269)		
C(S,D)	-.00032 (-.00044)		-.00032 (-.00044)	
C(S,T)	.00011 (.00015)			.00011 (.00015)
C(P,D)		.05715 (.07767)	.05715 (.07767)	
C(P,T)		.00853 (.01160)		.00853 (.01160)
C(D,T)			-.00065 (-.00088)	-.00065 (-.00088)
C(S,P,D)	.04247 (.05772)	.04247 (.05772)	.04247 (.05772)	
C(S,P,T)	.00157 (.00213)	.00157 (.00213)		.00157 (.00213)
C(S,D,T)	-.00015 (-.00021)		-.00015 (-.00021)	-.00015 (-.00021)
C(P,D,T)		-.00123 (-.00167)	-.00123 (-.00167)	-.00123 (-.00167)
C(S,P,D,T)	.00242 (.00329)	.00242 (.00329)	.00242 (.00329)	.00242 (.00329)
$R^2(X_i)$	.08677	.69830	.13478	.01211

$R^2(S,P,D,T) = .73582$

*Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,D,T)$.

TABLE V-I-30

Commonality Coefficients* for the Regression of Posttest on SES (S), Pretest (P), EdExAG Dummy Codes (D) and Teacher Variables (T) -- Cohort 6, Spring 1972, Language Total Score Analysis

	SES(S)	Pretest (P)	EdEXAG Dummy Codes(D)	Teacher Variables(T)
$U(X_1)$	.00297 (.00457)	.56212 (.86427)	.00493 (.00758)	.00192 (.00295)
C(S,P)	.02442 (.03754)	.02442 (.03754)		
C(S,D)	.00255 (.00392)		.00255 (.00392)	
C(S,T)	.00005 (.00008)			.00005 (.00008)
C(P,D)		.01691 (.02600)	.01691 (.02600)	
C(P,T)		.00631 (.00970)		.00631 (.00970)
C(D,T)			.00036 (.00055)	.00036 (.00055)
C(S,P,D)	.02013 (.03095)	.02013 (.03095)	.02013 (.03095)	
C(S,P,T)	.00114 (.00176)	.00114 (.00176)		.00114 (.00176)
C(S,D,T)	-.00105 (-.00162)		-.00105 (-.00162)	-.00105 (-.00162)
C(P,D,T)		-.00190 (-.00292)	-.00190 (-.00292)	-.00190 (-.00292)
C(S,P,D,T)	.00955 (.01468)	.00955 (.01468)	.00955 (.01468)	.00955 (.01468)
$R^2(X_1)$	.05975	.63868	.05147	.01637

$R^2(S,P,D,T) = .65040$

*Below each commonality coefficient and in parentheses is the normalized coefficient, that is,the commonality coefficient divided by $R^2(S,P,D,T)$.

TABLE V-I-31

Commonality Coefficients* for the Regression of Posttest on SES (S), Pretest (P), EdExAG Dummy Codes (D) and Teacher Variables (T) -- Cohort 6, Spring 1973, Language Total Score Analysis

	SES(S)	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.00113 (.00164)	.59885 (.87356)	.01175 (.01715)	.00172 (.00251)
C(S,P)	.04001 (.05837)	.04001 (.05837)		
C(S,D)	.00067 (.00098)		.00067 (.00098)	
C(S,T)	.00003 (.00005)			.00003 (.00005)
C(P,D)		.00276 (.00402)	.00276 (.00402)	
C(P,T)		.00330 (.00481)		.00330 (.00481)
C(D,T)			-.00149 (-.00218)	-.00149 (-.00218)
C(S,P,D)	.01903 (.02776)	.01903 (.02776)	.01903 (.02776)	
C(S,P,T)	.00057 (.00084)	.00057 (.00084)		.00057 (.00084)
C(S,D,T)	.00010 (.00015)		.00010 (.00015)	.00010 (.00015)
C(P,D,T)		.00200 (.00292)	.00200 (.00292)	.00200 (.00292)
C(S,P,D,T)	.00509 (.00743)	.00509 (.00743)	.00509 (.00743)	.00509 (.00743)
$R^2(X_i)$	.06664	.67161	.03992	.01133

$R^2(S,P,D,T) = .68552$

*Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,D,T)$.

TABLE V-I-32

Correlations of All Key Analysis Variables with Posttest - Language Total Score Analysis

Level of Correlation	Variable	Cohort 1 SP72	Cohort 1 SP73	Cohort 4 SP72	Cohort 4 SP73	Cohort 6 SP72	Cohort 6 SP73
Student/ Student	Socioeconomic Background	.370	.231	.339	.294	.244	.258
	Pretest	.368	.766	.824	.835	.799	.819
	Teacher's Age	.016	.047	.073	.053	-.104	-.094
	Teacher's Socioeconomic Background	.000	-.111	.042	.082	.052	.033
	Teaching Qualifications	.003	.126	.110	.018	-.126	-.046
EdExAG/ Student	Utilization of Objectives	.133	-.077	.049	-.032	.104	.049
	Individualization in Decision Making	-.062	-.098	-.015	-.042	.072	.043
	Teacher or Locally Developed Materials	-.018	-.114	-.022	-.120	.068	-.054
	Individualization of Instructional Pace	.095	-.004	.034	-.086	.043	-.057
	Scheduling Characteristics	.080	-.157	-.085	-.125	.126	.101
	Use of Performance Agreements	.036	-.081	.021	.047	.123	.047
	Classroom Group Organization	.023	.056	-.046	-.112	.102	.023
	Teaching Unit Composition	.108	-.088	.001	-.127	-.015	-.037

(continued)

TABLE V-I-32 (continued)

Level of Correlation	Variable	Cohort 1 SP72	Cohort 1 SP73	Cohort 4 SP72	Cohort 4 SP73	Cohort 6 SP72	Cohort 6 SP73
EdExAG/ Student	Completeness of Instructional Package	.025	-.149	.049	-.067	.093	-.019
	Utilization of Student Evaluation	.105	-.052	.093	-.086	.104	.059
	Degree of Individualization	.066	-.100	.049	-.053	.112	.031
	Level of Innovation	.086	-.139	.014	-.122	.111	.022
	Number of Minutes per Day	-.025	-.064	.019	.001	-.083	-.146
$r(p < .05)$ - Student/Student Level[1]		.069	.071	.043	.044	.050	.050
$r(p < .05)$ - EdExAG/Student Level[2]		.065	.066	.040	.042	.049	.049

[1] Absolute value of the coefficient required for a correlation between two student-level variables to be statistically significant ($\alpha \leqq .05$, two-tailed). Due to the large number of degrees of freedom, the critical ratio $z = r/\sigma_r$ where $\sigma_r = 1/\sqrt{N}$ was used.

[2] Absolute value of the coefficient required for a correlation between one student-level variable and an EdExAG-level variable to be statistically significant ($\alpha \leqq .05$, two-tailed)--see Equation IV-3 for the computing formula.

Note: For convenience, all coefficients in this table were truncated to three decimal places -- see Tables V-I-20 through V-I-25 for correlations with five-place accuracy.

TABLE V-I-33

Correlations of the Key Treatment Variables with Posttest Residualized on the Basis of Pretest and SES - Language Total Score Analysis

Variable	Cohort 1 SP72	Cohort 1 SP73	Cohort 4 SP72	Cohort 4 SP73	Cohort 6 SP72	Cohort 6 SP73
Utilization of Objectives	.061	-.225	-.029	-.039	.019	-.057
Individualization in Decision-Making	-.044	-.150	-.048	.002	.064	-.088
Teacher or Locally Developed Materials	.003	-.048	.010	-.067	.006	-.034
Individualization of Instructional Pace	.068	-.048	-.067	-.020	.034	-.088
Scheduling Characteristics	.121	-.114	-.102	.003	-.017	.020
Use of Performance Agreements	.086	-.068	-.069	.104	-.014	-.053
Classroom Group Organization	.056	.091	-.062	.083	-.048	.014
Teaching Unit Composition	.073	-.240	-.004	-.098	.060	-.123
Completeness of Instructional Package	-.004	-.168	-.033	-.045	.043	-.087
Utilization of Student Evaluation	.078	-.266	.003	-.022	.019	-.026
Degree of Individualization	.068	-.197	-.059	.036	.027	-.079
Level of Innovation	.079	-.226	-.058	-.012	.020	-.073
Number of Minutes per Day	.039	-.219	.016	.105	.067	-.097
r ($p < .05$) - EdExAG/Student Level[1]	.066	.065	.042	.042	.050	.049

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[1] Absolute value of the coefficient required for a correlation between one student-level variable (posttest residual) and an EdExAG-level variable to be statistically significant ($\alpha \leqq .05$, two-tailed) -- see Equation IV-3 for the computing formula. All correlations in this table are mixed-level correlations.

Note: For convenience, all coefficients were truncated to three decimal places.

TABLE V-I-34

Commonality Coefficients* for the Level of Innovation Growth Model--Cohort 1, Spring 1972, Language Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables LI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.09463 (.38450)	.10435 (.42401)	.00740 (.03008)	.00317 (.01289)
C(S,P)	.03946 (.16035)	.03946 (.16035)		
C(S,E)	.00798 (.03241)		.00798 (.03241)	
C(S,T)	-.00286 (-.01164)			-.00286 (-.01164)
C(P,E)		-.00502 (-.02038)	-.00502 (-.02038)	
C(P,T)		-.00074 (-.00299)		-.00074 (-.00299)
C(E,T)			-.00037 (-.00152)	-.00037 (-.00152)
C(S,P,E)	-.00271 (-.01102)	-.00271 (-.01102)	-.00271 (-.01102)	
C(S,P,T)	.00043 (.00175)	.00043 (.00175)		.00043 (.00175)
C(S,E,T)	.00018 (.00072)		.00018 (.00072)	.00018 (.00072)
C(P,E,T)		.00020 (.00083)	.00020 (.00083)	.00020 (.00083)
C(S,P,E,T)	.00000 (.00001)	.00000 (.00001)	.00000 (.00001)	.00000 (.00001)
$R^2(X_i)$	.13710	.13598	.00766	.00001

$R^2(S,P,E,T) = .24610$

$R^2(S,P,D,T)^+ = .33194$

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* Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**LI and NMIN are abbreviations for Level of Innovation and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-I-35

Commonality Coefficients* for the Level of Innovation Growth Model--
Cohort 1, Spring 1973, Language Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables LI and NMIN(E)**	Teaching Qualifications(T)
$U(X_1)$	.00059 (.00093)	.53270 (.83571)	.04425 (.06943)	.00017 (.00026)
C(S,P)	.06416 (.10065)	.06416 (.10065)		
C(S,E)	.00463 (.00726)		.00463 (.00726)	
C(S,T)	-.00007 (-.00011)			-.00007 (-.00011)
C(P,E)		-.00134 (-.00210)	-.00134 (-.00210)	
C(P,T)		.00593 (.00930)		.00593 (.00930)
C(E,T)			.00057 (.00089)	.00057 (.00089)
C(S,P,E)	-.02364 (-.03709)	-.02364 (-.03709)	-.02364 (-.03709)	
C(S,P,T)	.00964 (.01513)	.00964 (.01513)		.00964 (.01513)
C(S,E,T)	-.00032 (-.00050)		-.00032 (-.00050)	-.00032 (-.00050)
C(P,E,T)		.00137 (.00215)	.00137 (.00215)	.00137 (.00215)
C(S,P,E,T)	-.00121 (-.00190)	-.00121 (-.00190)	-.00121 (-.00190)	-.00121 (-.00190)
$R^2(X_1)$	.05377	.58761	.02431	.01607

$R^2(S,P,E,T) = .63742$

$R^2(S,P,D,T)^{+} = .67746$

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*Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**LI and NMIN are abbreviations for Level of Innovation and Number of Minutes per Day.

+The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-I-36

Commonality Coefficients* for the Level of Innovation Growth Model--Cohort 4, Spring 1972, Language Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables LI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.01376 (.01981)	.55944 (.80528)	.00118 (.00170)	.00135 (.00194)
C(S,P)	.10809 (.15559)	.10809 (.15559)		
C(S,E)	-.00070 (-.00101)		-.00070 (-.00101)	
C(S,T)	-.00056 (-.00081)			-.00056 (-.00081)
C(P,E)		.00118 (.00170)	.00118 (.00170)	
C(P,T)		.01506 (.02167)		.01506 (.02167)
C(E,T)			.00011 (.00015)	.00011 (.00015)
C(S,P,E)	-.00045 (-.00065)	-.00045 (-.00065)	-.00045 (-.00065)	
C(S,P,T)	-.00294 (-.00423)	-.00294 (-.00423)		-.00294 (-.00423)
C(S,E,T)	-.00014 (-.00020)		-.00014 (-.00020)	-.00014 (-.00020)
C(P,E,T)		.00083 (.00119)	.00083 (.00119)	.00083 (.00119)
C(S,P,E,T)	-.00149 (-.00214)	-.00149 (-.00214)	-.00149 (-.00214)	-.00149 (-.00214)
$R^2(X_i)$	.11558	.67972	.00052	.01221

$R^2(S,P,E,T) = .69472$

$R^2(S,P,D,T)^+ = .72024$

* Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**LI and NMIN are abbreviations for Level of Innovation and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-I-37

Commonality Coefficients* for the Level of Innovation Growth Model-- Cohort 4, Spring 1973, Language Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables LI and NMIN(E)**	Teaching Qualifications(T)
$U(X_1)$	.00184 (.00261)	.60599 (.86145)	.00346 (.00491)	.00018 (.00025)
C(S,P)	.07982 (.11347)	.07982 (.11347)		
C(S,E)	-.00039 (-.00055)		-.00039 (-.00055)	
C(S,T)	.00013 (.00018)			.00013 (.00018)
C(P,E)		.00563 (.00800)	.00563 (.00800)	
C(P,T)		.00065 (.00092)		.00065 (.00092)
C(E,T)			-.00002 (-.00003)	-.00002 (-.00003)
C(S,P,E)	.00676 (.00960)	.00676 (.00960)	.00676 (.00960)	
C(S,P,T)	-.00092 (-.00131)	-.00092 (-.00131)		-.00092 (-.00131)
C(S,E,T)	-.00003 (-.00004)		-.00003 (-.00004)	-.00003 (-.00004)
C(P,E,T)		.00081 (.00115)	.00081 (.00115)	.00081 (.00115)
C(S,P,E,T)	-.00043 (-.00061)	-.00043 (-.00061)	-.00043 (-.00061)	-.00043 (-.00061)
$R^2(X_1)$	.08677	.69830	.01578	.00036

$R^2(S,P,E,T) = .70346$

$R^2(S,P,D,T)^{+} = .73582$

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* Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**LI and NMIN are abbreviations for Level of Innovation and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-I-38

Commonality Coefficients* for the Level of Innovation Growth Model--Cohort 6, Spring 1972, Language Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables LI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.00512 (.00794)	.57693 (.89445)	.00174 (.00270)	.00006 (.00009)
C(S,P)	.03408 (.05283)	.03408 (.05283)		
C(S,E)	-.00057 (-.00089)		-.00057 (-.00089)	
C(S,T)	.00019 (.00029)			.00019 (.00029)
C(P,E)		.00227 (.00353)	.00227 (.00353)	
C(P,T)		.00308 (.00477)		.00308 (.00477)
C(E,T)			.00002 (.00004)	.00002 (.00004)
C(S,P,E)	.00951 (.01474)	.00951 (.01474)	.00951 (.01474)	
C(S,P,T)	.00329 (.00510)	.00329 (.00510)		.00329 (.00510)
C(S,E,T)	-.00022 (-.00034)		-.00022 (-.00034)	-.00022 (-.00034)
C(P,E,T)		.00116 (.00180)	.00116 (.00180)	.00116 (.00180)
C(S,P,E,T)	.00836 (.01296)	.00836 (.01296)	.00836 (.01296)	.00836 (.01296)
$R^2(X_i)$	.05975	.63868	.02227	.01594

$R^2(S,P,E,T) = .64501$

$R^2(S,P,D,T)^+ = .65040$

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* Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**LI and NMIN are abbreviations for Level of Innovation and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-I-39

Commonality Coefficients* for the Level of Innovation Growth Model--Cohort 6, Spring 1973, Language Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables LI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.00093 (.00137)	.60708 (.89429)	.00530 (.00781)	.00013 (.00020)
C(S,P)	.04893 (.07208)	.04893 (.07208)		
C(S,E)	.00095 (.00140)		.00095 (.00140)	
C(S,T)	-.00007 (-.00010)			-.00007 (-.00010)
C(P,E)		-.00023 (-.00033)	-.00023 (-.00033)	
C(P,T)		.00012 (.00018)		.00012 (.00018)
C(E,T)			-.00013 (-.00019)	-.00013 (-.00019)
C(S,P,E)	.01373 (.02023)	.01373 (.02023)	.01373 (.02023)	
C(S,P,T)	-.00008 (-.00012)	-.00008 (-.00012)		-.00008 (-.00012)
C(S,E,T)	.00011 (.00017)		.00011 (.00017)	.00011 (.00017)
C(P,E,T)		-.00008 (-.00012)	-.00008 (-.00012)	-.00008 (-.00012)
C(S,P,E,T)	.00213 (.00314)	.00213 (.00314)	.00213 (.00314)	.00213 (.00314)
$R^2(X_i)$	.06664	.67161	.02180	.00214

$R^2(S,P,E,T) = .67884$

$R^2(S,P,D,T)^{+} = .68552$

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* Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**LI and NMIN are abbreviations for Level of Innovation and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-I-40

Intercorrelations among the Level of Innovation Model Variables for the Cohort 1, Spring 1973 Analysis Sample

Variable	Variable Abbreviation					
	Posttest	SES	Pretest	LI	NMIN	TQ
Posttest	-	.232	.767	-.139	-.064	.127
SES	.232	-	.386	.147	.175	.166
Pretest	.767	.386	-	.021	.112	.142
Level of Innovations	-.139	.147	.021	-	-.044	.010
Number of Minutes per Day	-.064	.175	.112	-.044	-	-.045
Teaching Qualifications	.127	.166	.142	.010	-.045	-

TABLE V-I-41

Commonality Coefficients* for the Degree of Individualization Growth Model--
Cohort 1, Spring 1972, Language Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.09769 (.39939)	.10329 (.42227)	.00590 (.02411)	.00381 (.01559)
C(S,P)	.03859 (.15777)	.03859 (.15777)		
C(S,E)	.00491 (.02009)		.00491 (.02009)	
C(S,T)	-.00317 (-.01297)			-.00317 (-.01297)
C(P,E)		-.00395 (-.01616)	-.00395 (-.01616)	
C(P,T)		-.00115 (-.00470)		-.00115 (-.00470)
C(E,T)			-.00101 (-.00415)	-.00101 (-.00415)
C(S,P,E)	-.00184 (-.00752)	-.00184 (-.00752)	-.00184 (-.00752)	
C(S,P,T)	.00054 (.00222)	.00054 (.00222)		.00054 (.00222)
C(S,E,T)	.00049 (.00199)		.00049 (.00199)	.00049 (.00199)
C(P,E,T)		.00062 (.00252)	.00062 (.00252)	.00062 (.00252)
C(S,P,E,T)	-.00011 (-.00046)	-.00011 (-.00046)	-.00011 (-.00046)	-.00011 (-.00046)
$R^2(X_i)$	.13710	.13598	.00500	.00001

$R^2(S,P,E,T) = .24460$

$R^2(S,P,D,T)^+ = .33194$

* Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-I-42

Commonality Coefficients* for the Degree of Individualization Growth Model--Cohort 1, Spring 1973, Language Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.00069 (.00109)	.54132 (.85161)	.04247 (.06682)	.00017 (.00026)
C(S,P)	.06189 (.09737)	.06189 (.09737)		
C(S,E)	.00453 (.00713)		.00453 (.00713)	
C(S,T)	-.00008 (-.00012)			-.00008 (-.00012)
C(P,E)		-.00996 (-.01566)	-.00996 (-.01566)	
C(P,T)		.00609 (.00958)		.00609 (.00958)
C(E,T)			.00057 (.00089)	.00057 (.00089)
C(S,P,E)	-.02138 (-.03363)	-.02138 (-.03363)	-.02138 (-.03363)	
C(S,P,T)	.00952 (.01498)	.00952 (.01498)		.00952 (.01498)
C(S,E,T)	-.00032 (-.00050)		-.00032 (-.00050)	-.00032 (-.00050)
C(P,E,T)		.00121 (.00190)	.00121 (.00190)	.00121 (.00190)
C(S,P,E,T)	-.00109 (-.00171)	-.00109 (-.00171)	-.00109 (-.00171)	-.00109 (-.00171)
$R^2(X_i)$	.05377	.58761	.01603	.01607

$R^2(S,P,E,T) = .63564$

$R^2(S,P,D,T)^+ = .67746$

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* Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-I-43

Commonality Coefficients* for the Degree of Individualization Growth Model--Cohort 4, Spring 1972, Language Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_1)$	.01386 (.01995)	.56158 (.80808)	.00142 (.00204)	.00163 (.00234)
C(S,P)	.10452 (.15040)	.10452 (.15040)		
C(S,E)	-.00080 (-.00115)		-.00080 (-.00115)	
C(S,T)	-.00077 (-.00111)			-.00077 (-.00111)
C(P,E)		-.00096 (-.00138)	-.00096 (-.00138)	
C(P,T)		.01592 (.02291)		.01592 (.02291)
C(E,T)			-.00017 (-.00025)	-.00017 (-.00025)
C(S,P,E)	.00312 (.00449)	.00312 (.00449)	.00312 (.00449)	
C(S,P,T)	-.00450 (-.00648)	-.00450 (-.00648)		-.00450 (-.00648)
C(S,E,T)	.00007 (.00010)		.00007 (.00010)	.00007 (.00010)
C(P,E,T)		-.00003 (-.00005)	-.00003 (-.00005)	-.00003 (-.00005)
C(S,P,E,T)	.00008 (.00011)	.00008 (.00011)	.00008 (.00011)	.00008 (.00011)
$R^2(X_1)$	.11558	.67972	.00272	.01221

$R^2(S,P,E,T) = .69496$

$R^2(S,P,D,T)^{+} = .72024$

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* Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-I-44

Commonality Coefficients* for the Degree of Individualization Growth Model--
Cohort 4, Spring 1973, Language Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
U(X_i)	.00192 (.00273)	.61407 (.87213)	.00410 (.00583)	.00012 (.00017)
C(S,P)	.08511 (.12088)	.08511 (.12088)		
C(S,E)	-.00047 (-.00067)		-.00047 (-.00067)	
C(S,T)	.00011 (.00015)			.00011 (.00015)
C(P,E)		-.00245 (-.00348)	-.00245 (-.00348)	
C(P,T)		.00116 (.00165)		.00116 (.00165)
C(E,T)			.00003 (.00004)	.00003 (.00004)
C(S,P,E)	.00147 (.00209)	.00147 (.00209)	.00147 (.00209)	
C(S,P,T)	-.00122 (-.00173)	-.00122 (-.00173)		-.00122 (-.00173)
C(S,E,T)	-.00001 (-.00001)		-.00001 (-.00001)	-.00001 (-.00001)
C(P,E,T)		.00030 (.00042)	.00030 (.00042)	.00030 (.00042)
C(S,P,E,T)	-.00013 (-.00019)	-.00013 (-.00019)	-.00013 (-.00019)	-.00013 (-.00019)
$R^2(X_i)$	.08677	.69830	.00284	.00036

$R^2(S,P,E,T) = .70411$

$R^2(S,P,D,T)^+ = .73582$

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* Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-I-45

Commonality Coefficients* for the Degree of Individualization Growth Model--
Cohort 6, Spring 1972, Language Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.00505 (.00783)	.57600 (.89296)	.00177 (.00275)	.00005 (.00008)
C(S,P)	.03398 (.05268)	.03398 (.05268)		
C(S,E)	-.00050 (-.00078)		-.00050 (-.00078)	
C(S,T)	.00019 (.00029)			.00019 (.00029)
C(P,E)		.00320 (.00496)	.00320 (.00496)	
C(P,T)		.00307 (.00476)		.00307 (.00476)
C(E,T)			.00003 (.00005)	.00003 (.00005)
C(S,P,E)	.00961 (.01489)	.00961 (.01489)	.00961 (.01489)	
C(S,P,T)	.00342 (.00530)	.00342 (.00530)		.00342 (.00530)
C(S,E,T)	-.00022 (-.00034)		-.00022 (-.00034)	-.00022 (-.00034)
C(P,E,T)		.00116 (.00181)	.00116 (.00181)	.00116 (.00181)
C(S,P,E,T)	.00823 (.01276)	.00823 (.01276)	.00823 (.01276)	.00823 (.01276)
$R^2(X_i)$	.05975	.63868	.02329	.01594

$R^2(S,P,E,T) = .64505$

$R^2(S,P,D,T)^+ = .65040$

* Below each commonality coefficient and in parentheses is the normalized coefficient, that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-I-46

Commonality Coefficients* for the Degree of Individualization Growth Model--Cohort 6, Spring 1973, Language Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.00100 (.00147)	.60725 (.89470)	.00517 (.00762)	.00004 (.00006)
C(S,P)	.04785 (.07049)	.04785 (.07049)		
C(S,E)	.00088 (.00130)		.00088 (.00130)	
C(S,T)	-.00002 (-.00004)			-.00002 (-.00004)
C(P,E)		-.00039 (-.00057)	-.00039 (-.00057)	
C(P,T)		.00008 (.00012)		.00008 (.00012)
C(E,T)			-.00004 (-.00006)	-.00004 (-.00006)
C(S,P,E)	.01482 (.02183)	.01482 (.02183)	.01482 (.02183)	
C(S,P,T)	-.00007 (-.00011)	-.00007 (-.00011)		-.00007 (-.00011)
C(S,E,T)	.00007 (.00010)		.00007 (.00010)	.00007 (.00010)
C(P,E,T)		-.00004 (-.00006)	-.00004 (-.00006)	-.00004 (-.00006)
C(S,P,E,T)	.00213 (.00313)	.00213 (.00313)	.00213 (.00313)	.00213 (.00313)
$R^2(X_i)$	.06664	.67161	.02260	.00214

$R^2(S,P,E,T) = .67871$

$R^2(S,P,D,T)^+ = .68552$

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* Below each commonality coefficient and in parentheses is the normalized coefficient; that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-I-47

Regression Coefficients for the Level of Innovation Growth Model - Language Total Score Analysis[1]

Cohort	Posttest Year	Predictor	r	B	β	F
1	SP72	SES	.37	2.04	.32	98.03*
		Pretest	.37	1.97	.33	108.10*
		Level of Innovation	.09	1.18	.08	6.36*
		NMIN	-.03	.11	.05	2.15
		TQ	.00	-.46	-.06	3.29
		(Constant)		-43.32		(df = 1; 781)
1	SP73	SES	.23	-.19	-.03	1.22
		Pretest	.77	.83	.80	1100.43*
		Level of Innovation	-.14	-3.30	-.16	50.44*
		NMIN	-.06	-.31	-.16	47.47*
		TQ	.13	.14	.01	.35
		(Constant)		224.67		(df = 1; 749)
4	SP72	SES	.34	.96	.13	89.67*
		Pretest	.82	.91	.79	3644.95*
		Level of Innovation	.01	-.58	-.03	6.77*
		NMIN	.02	.05	.02	1.60
		TQ	.11	.36	.04	8.77*
		(Constant)		-46.94		(df = 1; 1989)
4	SP73	SES	.29	.35	.05	11.74*
		Pretest	.84	.87	.83	3874.59*
		Level of Innovation	-.12	.13	.01	.23
		NMIN	.00	.17	.06	21.68*
		TQ	.02	-.14	-.01	1.14
		(Constant)		56.07		(df = 1; 1896)

(continued)

TABLE V-I-47 (continued)

Cohort	Posttest Year	Predictor	r	B	β	F
6	SP72	SES	.24	.63	.08	21.42*
		Pretest	.80	.90	.79	2413.46*
		Level of Innovation	.11	.05	.00	.04
		NMIN	-.08	.34	.05	6.59*
		TQ	-.13	-.08	-.01	.23
		(Constant)		-15.23		(df = 1; 1485)
6	SP73	SES	.26	.29	.04	4.34*
		Pretest	.82	.89	.81	2837.35*
		Level of Innovation	.02	-.75	-.04	7.34*
		NMIN	-.15	-.63	-.06	15.98*
		TQ	-.05	.15	.01	.62
		(Constant)		78.90		(df = 1; 1501)

[1] Notation and abbreviation:

r = zero-order correlation with posttest

B = raw score regression coefficient

β = standard score regression coefficient

F = conventional F test of the regression coefficient

NMIN = EdExAG scale, Number of Minutes per Day (spent on language arts)

TQ = teacher scale, Teaching Qualifications

*$p \leq .05$

TABLE V-I-48

Regression Coefficients for the Degree of Individualization Growth Model - Language Total Score Analysis[1]

Cohort	Posttest Year	Predictor	r	B	β	F
1	SP72	SES	.37	2.06	.32	101.00*
		Pretest	.37	1.96	.33	106.79*
		Degree of Individualization	.07	2.44	.07	4.79*
		NMIN	-.03	.08	.04	1.32
		TQ	.00	-.51	-.06	3.94*
		(Constant)		-32.76		(df = 1; 781)
1	SP73	SES	.23	-.20	-.03	1.42
		Pretest	.77	.84	.80	1112.76*
		Degree of Individualization	-.10	-7.12	-.15	46.52*
		NMIN	-.06	-.33	-.17	53.93*
		TQ	.13	.14	.01	.35
		(Constant)		215.26		(df = 1; 749)
4	SP72	SES	.34	.96	.13	90.39*
		Pretest	.82	.91	.79	3661.81*
		Degree of Individualization	.05	-1.53	-.04	8.36*
		NMIN	.02	.04	.01	1.36
		TQ	.11	.39	.04	10.60*
		(Constant)		-50.55		(df = 1; 1989)
4	SP73	SES	.29	.36	.05	12.30*
		Pretest	.84	.87	.83	3934.81*
		Degree of Individualization	-.05	1.29	.03	4.37*
		NMIN	.00	.18	.06	24.03*
		TQ	.02	-.11	-.01	.79
		(Constant)		44.55		(df = 1; 1896)

(continued)

TABLE V-I-48 (continued)

Cohort	Posttest Year	Predictor	r	B	β	F
6	SP72	SES	.24	.63	.08	21.12*
		Pretest	.80	.90	.79	2409.81*
		Degree of Individualization	.11	.30	.01	.18
		NMIN	-.08	.33	.05	6.24*
		TQ	-.13	-.08	-.01	.21
		(Constant)		-15.48		(df = 1; 1485)
6	SP73	SES	.26	.31	.04	4.66*
		Pretest	.82	.89	.81	2836.96*
		Degree of Individualization	.03	-1.72	-.04	6.73*
		NMIN	-.15	-.59	-.06	13.66*
		TQ	-.05	.09	.01	.19
		(Constant		79.69		(df = 1; 1501)

[1] Notation and abbreviations:

r = zero-order correlation with posttest

B = raw score regression coefficient

β = standard score regression coefficient

F = conventional F test of the regression coefficient

NMIN = EdExAG scale, Number of Minutes per Day (spent on language arts)

TQ = teacher scale, Teaching Qualifications

*p ≦ .05

TABLE V-I-49

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups-- Cohort 1, Spring 1972, Language Total Score Analysis

Variable		Greatest Negative Outliers		Greatest Positive Outliers		
Number of Students		18	14	73	43	32
Posttest Residualized for Pretest and SES	$\bar{X}$	-39.49	-40.71	21.87	17.19	15.39
	SD	46.03	35.11	49.65	50.54	33.30
	g^1	-0.24	-0.45	0.04	0.11	0.10
Pretest (National Norm MA=85)	$\bar{X}$	96.02	84.63	94.69	96.62	93.75
	SD	10.24	11.94	9.50	9.14	10.93
	g	-0.10	-0.03	-1.42	-0.77	-0.88
Posttest Interpolated National Norm-321.5)	$\bar{X}$	292.36	258.43	357.18	353.61	336.83
	SD	53.80	29.57	52.86	56.84	36.92
	g	0.34	-0.48	0.00	0.50	0.38
SES	$\bar{X}$	96.78	91.34	99.73	98.47	93.78
	SD	7.91	5.86	9.25	6.50	8.73
	g	0.98	-1.16	-0.02	0.76	0.02
Ethnic Group[2] (white=1; non-white=0)	$\bar{X}$	0.50	0.64	0.99	0.81	0.56
Sex[2] (girl=1; boy=0)	$\bar{X}$	0.56	0.64	0.56	0.44	0.56
Utilization of Objectives		3.00	2.33	3.00	3.00	3.00
Individualization in Decision Making		1.00	1.00	1.00	1.00	1.00

(continued)

[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is an EdExAG-group mean for variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-I-49 (continued)

Variable	Greatest Negative Outliers		Greatest Positive Outliers		
Teacher or Locally Developed Materials	1.00	2.00	1.50	1.00	1.50
Individualization of Instructional Pace	2.00	1.00	3.00	2.00	3.00
Scheduling Characteristics	1.00	1.00	3.00	1.00	3.00
Use of Performance Agreements	1.00	1.00	2.00	1.00	3.00
Classroom Group Organization	2.00	2.00	2.00	3.00	3.00
Teaching Unit Composition	2.50	2.00	1.50	2.00	2.00
Completeness of Instructional Package	2.00	1.50	3.00	1.00	2.50
Utilization of Student Evaluation	2.00	2.67	2.00	2.33	3.00
Level of Innovation	17.50	16.50	22.00	17.33	25.00
Degree of Individualization	6.00	5.67	8.00	6.33	10.00
Number of School Days per Year	180.00	180.00	180.00	180.00	180.00
Number of Minutes per Day	90.00	105.00	90.00	120.00	70.00
Number of Teachers $\bar{X}$	4.00	1.00	1.00	2.00	1.00
Teacher's Age $\bar{X}$	29.50	24.00	25.32	35.00	46.88
Teacher's Socioeconomic Background $\bar{X}$	110.35	117.86	108.32	104.78	95.05
Teaching Qualifications $\bar{X}$	89.91	86.49	87.74	100.29	108.05

TABLE V-I-50

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups-- Cohort 1, Spring 1973, Language Total Score Analysis

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Students		23	80	113	35	23	41
Posttest Residualized for Pretest and SES	$\bar{X}$	-9.54	-18.98	-2.68	30.41	26.89	24.15
	SD	45.13	36.18	40.21	49.59	52.51	36.54
	g^1	-0.39	-0.27	-1.21	0.41	0.47	0.69
Pretest (National Norm=327)	$\bar{X}$	288.99	348.64	356.25	299.64	310.56	345.63
	SD	60.06	55.18	62.30	60.12	64.81	65.53
	g	-0.03	0.26	0.06	-0.85	0.56	-0.08
Posttest (National Norm=382)	$\bar{X}$	354.35	387.40	388.08	404.82	410.48	437.69
	SD	72.39	65.55	63.35	74.14	84.50	58.75
	g	0.08	0.23	-0.31	0.11	0.39	0.22
Attitude toward Language Arts SP73	$\bar{X}$	*	102.98	101.35			99.43
	SD		10.17	10.29			11.66
	g		-0.68	-0.32			-0.12
SES	$\bar{X}$	97.81	111.81	104.01	94.61	94.46	93.10
	SD	8.62	2.91	9.29	7.60	9.10	5.18
	g	0.95	-0.73	-0.44	0.38	0.07	1.04
Ethnic Group[2] (white=1; non-white=0)	$\bar{X}$	0.61	1.00	0.86	0.45	0.74	0.95
Sex[2] (girl=1;boy=0)	$\bar{X}$	0.43	0.51	0.61	0.70	0.48	0.39

(continued)

[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is an EdExAG-group mean for variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

*Note: Blank entries indicate no data collected.

TABLE V-I-50 (continued)

Variables	Greatest Negative Outliers			Greatest Positive Outliers		
Utilization of Objectives	3.00	3.00	3.00	1.00	3.00	1.00
Individualization in Decision Making	3.00	1.00	1.67	1.00	1.00	1.00
Teacher or Locally Developed Materials	1.00	1.50	2.00	2.00	1.50	2.00
Individualization of Instructional Pace	3.00	3.00	2.00	2.00	3.00	2.00
Scheduling Characteristics	3.00	1.00	2.00	1.00	2.00	1.00
Use of Performance Agreements	2.00	1.00	2.00	1.00	1.00	1.00
Classroom Group Organization	3.00	2.00	2.00	2.00	3.00	2.00
Teaching Unit Composition	1.50	2.00	3.00	1.00	1.50	1.00
Completeness of Instructional Package	2.50	3.00	2.00	1.50	2.50	1.50
Utilization of Student Evaluation	1.67	2.67	3.00	1.00	2.00	2.33
Level of Innovation	23.67	20.17	22.67	13.50	20.50	14.83
Degree of Individualization	9.67	7.67	8.67	5.00	7.00	6.33
Number of School Days per Year	180.00	176.00	200.00	180.00	180.00	180.00
Number of Minutes per Day	50.00	115.00	150.00	50.00	100.00	90.00
Teacher/Student Contact Ratio[3]	3.60	3.04	6.67	3.87	3.56	3.45

(continued)

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[3] Relative measure of teacher/student contact equal to the percent of teacher time per individual student

TABLE V-I-50 (continued)

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Teachers	$\bar{X}$	1.00	1.00	1.00	1.00	1.00	1.00
Teacher's Age	$\bar{X}$	30.00	30.00	35.31	60.00	24.00	30.00
Teacher's Socioeconomic Background	$\bar{X}$	111.67	114.65	96.84	108.04	98.24	91.26
Teaching Qualifications	$\bar{X}$	100.12	104.15	101.20	109.96	102.60	100.29

TABLE V-I-51

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups-- Cohort 4, Spring 1972, Language Total Score Analysis

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Students		14	23	19	10	56	49
Posttest Residualized for Pretest and SES	$\bar{X}$	-20.90	-34.86	-52.73	40.72	28.06	20.99
	SD	26.27	58.85	41.48	33.77	36.47	35.42
	g^1	0.26	-0.97	-1.45	0.51	0.03	0.58
Pretest (National Norm=422)	$\bar{X}$	450.30	454.19	436.37	452.20	501.81	446.08
	SD	55.31	62.38	67.92	45.78	42.07	39.05
	g	-0.41	-0.30	-0.08	-0.05	-0.06	0.32
Posttest (National Norm=461)	$\bar{X}$	470.60	448.32	420.57	526.36	573.08	502.53
	SD	59.76	75.95	67.22	49.61	48.52	54.38
	g	0.37	-0.75	0.23	-0.19	0.19	0.12
Attitude toward Language Arts SP71	$\bar{X}$	98.36	104.06	97.98	100.51	101.26	98.80
	SD	9.46	8.59	9.14	12.66	8.87	8.73
	g	-0.22	-1.30	0.04	-0.51	-0.57	0.02
Attitude toward Language Arts SP72	$\bar{X}$	*	103.72		100.57	101.40	98.80
	SD		8.59		9.16	8.37	10.06
	g		-0.62		-0.23	-0.40	0.08
SES	$\bar{X}$	103.51	90.12	97.34	94.94	110.73	96.63
	SD	7.50	5.99	6.01	6.83	5.98	[illegible]
	g	-0.01	0.11	1.12	0.88	-1.28	[illegible]
Ethnic Group[2] (white=1; non-white=0)	$\bar{X}$	0.75	0.91	0.63	1.00	1.00	1.00

(continued)

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[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is an EdExAG-group mean for variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

*Note: Blank entires indicate no data collected.

TABLE V-I-51 (continued)

Variable	Greatest Negative Outliers			Greatest Positive Outliers		
Sex[2] (girl=1; boy=0) $\bar{X}$	0.45	0.43	0.50	0.70	0.52	0.53
Utilization of Objectives	3.00	1.00	3.00	1.00	1.67	1.00
Individualization in Decision Making	1.00	1.00	1.00	1.00	1.67	1.00
Teacher or Locally Developed Materials	1.50	1.00	1.50	1.50	2.50	1.50
Individualization of Instructional Pace	3.00	1.00	3.00	1.00	2.00	1.00
Scheduling Characteristics	3.00	1.00	3.00	1.00	1.00	1.00
Use of Performance Agreements	3.00	1.00	3.00	1.00	2.00	1.00
Classroom Group Organization	3.00	1.00	3.00	1.00	1.00	1.00
Teaching Unit Composition	2.00	2.00	2.50	2.00	1.50	2.50
Completeness of Instructional Package	2.50	1.50	2.50	1.50	2.00	1.50
Utilization of Student Evaluation	3.00	1.67	3.00	2.33	2.67	2.33
Level of Innovation	25.00	12.17	25.50	13.33	18.00	13.83
Degree of Individualization	10.00	4.67	10.00	5.33	8.34	5.33
Number of School Days per Year	180.00	180.00	180.00	180.00	180.00	180.00
Number of Minutes per Day	60.00	45.00	60.00	90.00	60.00	90.00

(continued)

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[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-I-51 (continued)

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Teachers	$\bar{X}$	1.00	1.00	2.00	1.00	1.00	1.00
Teacher's Age	$\bar{X}$	24.00	50.00	35.00	50.00	50.00	40.00
Teacher's Socioeconomic Background	$\bar{X}$	101.71	91.11	105.40	91.11	87.22	96.82
Teaching Qualifications	$\bar{X}$	91.70	108.14	99.43	109.66	114.11	101.77

TABLE V-I-52

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups--Cohort 4, Spring 1973, Language Total Score Analysis

Variables		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Students		25	32	13	18	28	23
Posttest Residualized for Pretest and SES	$\bar{X}$	-19.76	-21.18	-24.48	52.02	39.33	33.42
	SD	30.02	32.52	66.75	31.26	33.07	43.22
	g^1	-0.31	-0.24	-0.85	-0.27	-0.28	-0.20
Pretest (National Norm=461)	$\bar{X}$	447.29	479.74	460.00	450.08	492.87	525.20
	SD	29.20	81.66	49.47	62.17	80.59	60.29
	g^1	-0.21	0.39	-0.58	0.30	0.30	0.19
Posttest (National Norm=497)	$\bar{X}$	461.75	491.02	467.67	534.15	559.07	586.10
	SD	36.13	68.70	72.92	68.29	63.10	55.89
	g	-0.11	0.21	0.32	-0.01	-0.01	0.01
Attitude toward Language Arts SP72	$\bar{X}$	104.69	99.52	*	95.85	99.44	104.07
	SD	7.13	8.88		11.45	6.63	8.11
	g	-0.44	0.00		0.19	0.55	-0.74
Attitude toward Language Arts SP73	$\bar{X}$	93.80	97.60		94.22	105.07	106.98
	SD	9.13	11.41		10.17	10.28	9.25
	g	0.44	0.23		0.39	-0.75	-0.82
SES	$\bar{X}$	98.15	106.63	97.12	92.49	94.67	110.57
	SD	8.69	8.29	5.58	5.26	7.70	6.04
	g	-0.11	-0.62	1.02	-0.68	1.04	-0.80
Ethnic Group^2 (white=1; non-white=0)	$\bar{X}$	0.92	0.97	0.63	0.89	1.00	1.00

(continued)

[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is an EdExAG-group mean for variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

*Note: Blank entries indicate no data collected.

TABLE V-I-52 (continued)

Variable	Greatest Negative Outliers			Greatest Positive Outliers		
Sex[2] (girl=1; boy=0) $\bar{X}$	0.44	0.50	0.50	0.44	0.61	0.39
Utilization of Objectives	3.00	3.00	1.00	1.67	3.00	3.00
Individualization in Decision Making	1.00	2.00	1.00	1.67	1.00	1.67
Teacher or Locally Developed Materials	1.00	2.00	2.00	2.00	2.00	2.50
Individualization of Instructional Pace	2.00	3.00	2.00	2.00	3.00	3.00
Scheduling Characteristics	1.00	2.00	1.00	2.00	1.00	3.00
Use of Performance Agreements	1.00	3.00	1.00	2.00	3.00	3.00
Classroom Group Organization	3.00	2.00	2.00	2.00	3.00	3.00
Teaching Unit Composition	2.00	2.50	1.00	2.50	2.00	1.00
Completeness of Instructional Package	1.00	2.50	1.50	2.00	2.50	2.50
Utilization of Student Evaluation	2.67	2.33	1.00	1.67	2.67	2.67
Level of Innovation	17.67	24.33	13.50	19.50	23.17	25.33
Degree of Individualization	6.67	10.33	5.00	7.34	9.67	10.34
Number of School Days per Year	180.00	200.00	180.00	182.00	180.00	178.00
Number of Minutes per Day	105.00	50.00	50.00	65.00	120.00	90.00

(continued)

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[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-I-52 (continued)

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Teacher/Student Contact Ratio[3]	$\bar{X}$	3.31	3.33	3.87	3.33	4.13	3.94
Number of Teachers	$\bar{X}$	1.04	1.03	1.00	2.00	2.00	9.96
Teacher's Age	$\bar{X}$	39.80	40.00	30.00	40.00	55.00	31.16
Teacher's Socioeconomic Background	$\bar{X}$	82.96	93.95	96.90	94.69	82.68	105.28
Teaching Qualifications	$\bar{X}$	105.14	106.57	97.95	86.63	106.31	91.55

[3] Relative measure of teacher/student contact equal to the percent of teacher time per individual student

TABLE V-I-53

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups-- Cohort 6, Spring 1972, Language Total Score Analysis

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Students		103	57	161	84	102	47
Posttest Residualized for Pretest and SES	$\bar{X}$	-2.75	-9.00	-10.79	14.31	6.90	5.75
	SD	45.89	40.96	42.16	44.31	55.99	36.28
	g[1]	-0.24	0.76	-0.16	0.28	0.07	-0.12
Pretest (National Norm=497)	$\bar{X}$	495.45	501.49	541.46	517.18	534.65	517.86
	SD	64.72	72.05	71.14	64.94	66.12	75.54
	g	0.68	0.40	0.14	-.13	-0.06	0.13
Posttest (Interpolated National Norm=531.5)	$\bar{X}$	501.92	503.38	543.62	546.06	554.31	534.11
	SD	73.29	76.04	72.24	80.45	72.80	72.37
	g	0.46	0.77	0.16	0.19	0.20	0.16
Attitude toward Language Arts SP71	$\bar{X}$	105.37	98.57	100.45	103.65	104.09	100.75
	SD	10.49	10.18	9.20	10.16	10.09	8.94
	g	-0.73	0.15	-0.09	-0.36	-0.60	-0.09
Attitude toward Language Arts SP72	$\bar{X}$	99.38	*	98.15	105.81	106.67	
	SD	11.02		9.50	8.73	8.42	
	g	0.06		0.08	-0.63	-0.53	
SES	$\bar{X}$	93.99	98.03	108.82	107.45	107.26	100.24
	SD	8.53	7.50	6.84	8.51	7.25	9.24
	g	0.47	0.49	-1.12	-0.91	-0.78	0.29

(continued)

[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is an EdExAG-group mean for variable X, and

N = number of students.

*Note: Blank entries indicate no data collected.

TABLE V-I-53 (continued)

Variable		Greatest Negative Outliers			Greatest Positive Outliers	
Ethnic Group[2] (white=1; non-white=0) $\bar{X}$	0.39	0.69	0.98	0.86	0.92	0.79
Sex[2] (girl=1; boy=0) $\bar{X}$	0.56	0.49	0.50	0.45	0.60	0.51
Utilization of Objectives	1.67	1.00	3.00	3.00	3.00	1.00
Individualization in Decision Making	1.00	1.33	1.00	2.00	1.00	1.00
Teacher or Locally Developed Materials	1.00	1.50	2.50	2.00	2.00	2.00
Individualization of Instructional Pace	1.00	2.00	2.00	2.00	3.00	2.00
Scheduling Characteristics	1.00	1.00	3.00	2.00	2.00	1.00
Use of Performance Agreements	1.00	1.00	2.00	1.00	1.00	2.00
Classroom Group Organization	1.00	2.00	3.00	2.00	2.00	2.00
Teaching Unit Composition	1.00	2.00	1.00	2.00	2.00	2.00
Completeness of Instructional Package	1.50	1.50	2.00	2.50	2.50	1.50
Utilization of Student Evaluation	1.67	1.67	3.00	3.00	3.00	1.67
Level of Innovation	11.83	15.00	22.50	21.50	21.50	16.17
Degree of Individualization	4.67	6.00	8.00	8.00	8.00	6.67

(continued)

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-I-53 (continued)

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of School Days per Year		180.00	180.00	180.00	200.00	200.00	180.00
Number of Minutes per Day		60.00	60.00	30.00	60.00	60.00	60.00
Number of Teachers	$\bar{X}$	1.19	1.00	4.00	2.71	1.96	1.00
Teacher's Age	$\bar{X}$	36.89	30.00	29.50	32.15	30.10	30.00
Teacher's Socio-economic Background	$\bar{X}$	93.93	98.65	111.32	97.40	112.04	117.86
Teaching Qualifications	$\bar{X}$	102.18	91.53	85.27	92.83	92.05	103.06

TABLE V-I-54

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups-- Cohort 6, Spring 1973, Language Total Score Analysis

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Students		42	45	46	165	375	27
Posttest Residualized for Pretest and SES	$\bar{X}$	-13.22	-14.15	-15.58	13.77	7.26	2.77
	SD	39.16	42.06	34.75	44.13	53.11	39.42
	g^1	0.40	-0.62	-0.04	-0.01	-1.19	-0.22
Pretest (Interpolated National Norm=531.5)	$\bar{X}$	563.62	579.10	577.41	554.64	539.93	530.87
	SD	94.57	70.21	68.69	73.48	75.90	52.48
	g	0.61	0.74	0.14	0.45	0.62	0.33
Posttest (National Norm=557)	$\bar{X}$	556.37	580.20	577.23	586.97	562.63	551.20
	SD	85.85	82.02	65.74	79.85	85.59	65.46
	g	0.41	1.09	0.50	0.39	0.08	0.42
Attitude toward Language Arts SP72	$\bar{X}$	105.70	106.67	105.87	98.15	99.24	*
	SD	8.01	9.24	9.16	9.08	9.80	
	g	-0.75	-0.73	-0.93	0.00	-0.15	
Attitude toward Language Arts SP73	$\bar{X}$	101.11	105.63	102.42	97.44	100.58	
	SD	7.71	7.60	8.9[illegible]	9.46	9.82	
	g	-0.55	-0.14	-0.39	0.09	-0.18	
SES	$\bar{X}$	104.62	107.24	107.15	108.80	96.22	99.19
	SD	7.87	6.69	7.94	6.93	6.91	8.26
	g	-0.71	-0.43	=0.81	-1.03	-.76	0.63

(continued)

[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is an EdExAG-group mean for variable X, and
N = number of students.

*Note: Blank entries indicate no data collected.

TABLE V-I-54 (continued)

Variable	Greatest Negative Outliers			Greatest Positive Outliers		
Ethnic Group[2] (white=1; non-white=0) $\bar{X}$	0.83	0.91	0.93	0.98	0.97	0.85
Sex[2] (girl=1; boy=0) $\bar{X}$	0.57	0.60	0.57	0.51	0.57	0.52
Utilization of Objectives	3.00	3.00	3.00	3.00	1.67	1.00
Individualization in Decision Making	2.00	2.00	1.33	1.00	1.00	1.00
Teacher or Locally Developed Materials	2.00	2.00	1.50	2.50	2.00	2.00
Individualization of Instructional Pace	3.00	2.00	2.00	2.00	1.00	1.00
Scheduling Characteristics	2.00	2.00	2.00	3.00	1.00	1.00
Use of Performance Agreements	3.00	1.00	2.00	2.00	1.00	2.00
Classroom Group Organization	2.00	2.00	2.00	2.00	2.00	3.00
Teaching Unit Composition	2.50	2.50	2.50	1.00	1.00	1.50
Completeness of Instructional Pace	2.50	2.00	1.50	2.00	1.00	1.00
Utilization of Student Evaluation	2.33	3.00	3.00	3.00	1.33	1.00
Level of Innovation	24.33	21.50	20.83	21.50	13.00	14.50
Degree of Individualization	10.33	8.00	8.33	8.00	4.33	5.00

(continued)

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-I-54 (continued)

Variable		Greatest Negative Outliers			Greatest Positive Outliers	
Number of School Days per Year		200.00	200.00	200.00	178.00	182.00	180.00
Number of Minutes per Day		50.00	50.00	50.00	30.00	50.00	50.00
Teacher/Student Contact Ratio[3]		3.33	2.70	3.33	2.86	3.35	3.85
Number of Teachers	$\bar{X}$	1.02	1.00	1.02	6.00	1.00	1.00
Teacher's Age	$\bar{X}$	40.00	30.00	24.17	34.00	39.36	30.00
Teacher's Socioeconomic Background	$\bar{X}$	93.95	117.84	107.04	110.15	102.47	98.24
Teaching Qualifications	$\bar{X}$	106.55	98.57	92.46	91.50	103.20	102.44

[3] Relative measure of teacher/student contact equal to the percent of teacher time per individual student

TABLE V-I-55

Comparison of Key Analysis Variables for Students Exhibiting Unusual Longitudinal Growth Patterns In Two Consecutive School Years--Cohort 1, Language Total Score Analysis

Variable		Consistent Underachievers		Consistent Overachievers	
Number of Students		55		58	
SES	$\bar{X}$	101.84		102.49	
	SD	10.28		9.55	
	g	0.03		-0.20	
Sex^2 (girl=1; boy=0)	$\bar{X}$	0.38		0.69	
Ethnic Group^2 (white=1; non-white=0)	$\bar{X}$	0.91		0.83	
		Analysis Year		Analysis Year	
		SP72	SP73	SP72	SP73
Pretest (Nat'l Norm MA=85 for SP72; Nat'l Norm=327 for SP73)	$\bar{X}$	92.94	280.75	96.11	405.07
	SD	9.66	34.55	11.16	37.92
	g	-0.26	0.13	-1.85	-0.44
Posttest(Nat'l Norm = for SP72; =382 for SP73)	$\bar{X}$	280.75	308.54	405.07	509.32
	SD	34.55	36.40	37.92	40.59
	g	0.13	-0.07	-0.44	-0.17
Posttest Residualized for Pretest and SES	$\bar{X}$	-55.53	-46.95	61.45	50.71
	SD	21.48	-20.04	23.54	24.18
	g	-1.07	-0.77	0.47	0.62
Attitude toward Language Arts at Time of Pretest	$\bar{X}$	*			
	SD				
	g				

(continued)

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[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from X, where X is that group's mean on variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

*Note: Blank entries indicate no data collected.

TABLE V-I-55 (continued)

Variable		Consistent Underachievers		Consistent Overachievers	
		SP72	SP73	SP72	SP73
Attitude toward Language at Time of Posttest	$\bar{X}$	*	100.57		99.58
	SD		10.91		10.17
	g		-0.35		0.02
Utilization of Objectives	$\bar{X}$	2.79	2.89	2.69	2.48
	SD	0.58	0.35	0.72	0.77
Individualization in Decision Making	$\bar{X}$	1.45	1.53	1.43	1.40
	SD	0.57	0.55	0.55	0.49
Teacher or Locally Developed Materials	$\bar{X}$	1.66	1.70	1.61	1.72
	SD	0.43	0.38	0.56	0.40
Individualization of Instructional Pace	$\bar{X}$	2.35	2.36	2.38	2.19
	SD	0.67	0.52	0.55	0.39
Scheduling Characteristics	$\bar{X}$	1.60	1.84	1.72	1.53
	SD	0.65	0.73	0.71	0.56
Use of Performance Agreements	$\bar{X}$	1.55	1.85	1.64	1.81
	SD	0.60	0.82	0.61	0.84
Classroom Group Organization	$\bar{X}$	1.96	2.35	2.38	2.33
	SD	0.81	0.48	0.64	0.47
Teaching Unit Composition	$\bar{X}$	2.05	2.26	2.02	2.09
	SD	0.68	0.59	0.66	0.71
Completeness of Instructional Package	$\bar{X}$	2.38	2.27	2.01	1.93
	SD	0.58	0.56	0.71	0.59
Utilization of Student Evaluation	$\bar{X}$	2.50	2.60	2.49	2.44
	SD	0.60	0.41	0.57	0.52
Level of Innovation	$\bar{X}$	20.30	21.66	20.37	19.92
	SD	3.78	2.60	4.37	3.56

(continued)

*Note: Blank entries indicate no data collected.

TABLE V-I-55 (continued)

Variable		Consistent Underachievers		Consistent Overachievers	
		SP72	SP73	SP72	SP73
Degree of Individualization	$\bar{X}$	7.85	8.34	7.94	7.84
Number of School Days per Year	$\bar{X}$	184.44	184.44	184.62	184.62
	SD	9.67	9.67	8.72	8.72
Number of Minutes per Day	$\bar{X}$	88.82	97.82	100.26	90.09
	SD	24.18	38.73	27.46	26.63
Teacher/Student Contact Ratio[3]	$\bar{X}$	*	4.22		4.15
	SD		1.53		1.44
Number of Teachers	$\bar{X}$	2.27	1.11	1.98	1.03
	SD	1.93	0.31	1.47	0.26
Teacher's Age	$\bar{X}$	31.42	32.72	34.31	36.91
	SD	5.98	8.18	9.37	11.60
Teacher's Socioeconomic Background	$\bar{X}$	102.13	104.23	100.83	99.95
	SD	7.61	12.04	7.70	10.33
Teaching Qualifications	$\bar{X}$	98.51	100.23	99.20	102.71
	SD	7.33	6.49	6.42	6.71

[3] Relative measure of teacher/student contact equal to the percent of teacher time per individual student.

*Note: Blank entries indicate no data collected.

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TABLE V-I-56

Comparison of Key Analysis Variables for Students Exhibiting Unusual Longitudinal Growth Patterns In Two Consecutive School Years--Cohort 4, Language Total Score Analysis

Variables		Consistent Underachievers		Consistent Overachievers	
Number of Students		79		101	
SES	$\bar{X}$	100.37		99.66	
	SD	10.40		9.26	
	g^1	0.11		0.13	
Sex^2 (girl=1; boy=0)	$\bar{X}$	0.33		0.58	
Ethnic Group^2 (while=1; non-white=0)	$\bar{X}$	0.86		0.91	
		Analysis Year		Analysis Year	
		SP72	SP73	SP72	SP73
Pretest (Nat'l Norm =422 for SP72; Nat'l Norm=461 for SP73)	$\bar{X}$	419.97	416.44	462.35	540.63
	SD	63.07	54.82	46.80	48.93
	g	0.53	0.46	-0.12	-0.10
Posttest(Nat'l Norm =461 for SP72; =497 for SP73)	$\bar{X}$	416.44	414.74	540.63	608.55
	SD	54.84	52.38	48.93	47.51
	g	0.46	0.31	0.10	-0.18
Posttest Residualized for Pretest and SES	$\bar{X}$	-44.54	-40.85	41.52	45.98
	SD	21.19	20.88	17.57	19.35
	g	-1.55	-1.73	1.11	0.71
Attitude toward Language Arts at Time of Pretest	$\bar{X}$	96.77	98.57	102.13	101.14
	SD	10.78	11.00	9.23	8.62
	g	0.02	-0.10	-0.80	-0.30

(continued)

[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is that group's mean on variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-I-56 (continued)

Variable		Consistent Underachievers		Consistent Overachievers	
		SP72	SP73	SP72	SP73
Attitude toward Language Arts at Time of Posttest	$\bar{X}$	98.57	100.51	101.14	102.80
	SD	11.00	11.40	8.62	9.29
	g	-0.10	-0.22	-0.30	-0.19
Utilization of Objectives	$\bar{X}$	2.73	2.59	2.27	2.36
	SD	0.63	0.56	0.90	0.75
Individualization in Decision Making	$\bar{X}$	1.46	1.49	1.28	1.34
	SD	0.43	0.41	0.36	0.40
Teacher or Locally Developed Materials	$\bar{X}$	1.91	2.08	1.78	1.93
	SD	0.53	0.61	0.55	0.54
Individualization of Instructional Pace	$\bar{X}$	2.10	2.37	1.87	2.13
	SD	0.59	0.66	0.65	0.67
Scheduling Characteristics	$\bar{X}$	1.72	1.81	1.46	1.61
	SD	0.59	0.58	0.55	0.60
Use of Performance Agreements	$\bar{X}$	1.43	1.71	1.41	1.73
	SD	0.57	0.84	0.58	0.78
Classroom Group Organization	$\bar{X}$	1.85	2.11	1.74	2.01
	SD	0.64	0.53	0.73	0.70
Teaching Unit Composition	$\bar{X}$	1.94	2.11	1.71	1.72
	SD	0.69	0.61	0.70	0.65
Completeness of Instructional Package	$\bar{X}$	2.10	2.18	1.89	2.05
	SD	0.55	0.47	0.63	0.48
Utilization of Student Evaluation	$\bar{X}$	2.62	2.60	2.35	2.57
	SD	0.57	0.53	0.65	0.47
Level of Innovation	$\bar{X}$	19.87	21.15	17.77	19.46
	SD	3.54	3.10	4.40	3.75

(continued)

TABLE V-I-56 (continued)

Variable		Consistent Underachievers SP72	SP73	Consistent Overachievers SP72	SP73
Degree of Individualization	$\bar{X}$	7.61	8.17	6.91	7.77
Number of School Days per Year	$\bar{X}$	182.53	182.71	182.02	181.88
	SD	7.51	7.50	6.70	6.84
Number of Minutes per Day	$\bar{X}$	98.54	75.24	97.38	84.03
	SD	21.89	26.23	24.96	26.94
Teacher/Student Contact Ratio[3]	$\bar{X}$	*	3.24	*	3.43
	SD		0.73		0.60
Number of Teachers	$\bar{X}$	1.57	1.38	1.95	1.82
	SD	1.31	0.70	1.93	2.13
Teacher's Age	$\bar{X}$	34.49	35.89	38.47	37.81
	SD	8.89	9.84	11.34	9.90
Teacher's Socioeconomic Background	$\bar{X}$	100.54	100.03	99.05	98.16
	SD	9.98	9.14	10.86	10.45
Teaching Qualifications	$\bar{X}$	101.97	100.98	103.14	101.01
	SD	8.22	7.82	7.51	6.48

[3] Relative measure of teacher/student contact equal to the percent of teacher time per individual student

*Note: Blank entries indicate no data collected.

TABLE V-I-57

Comparison of Key Analysis Variables for Students Exhibiting Unusual Longitudinal Growth Patterns In Two Consecutive School Years--Cohort 6, Language Total Score Analysis

Variables		Consistent Underachievers		Consistent Overachievers	
Number of Students		49		69	
SES	$\bar{X}$	100.85		100.24	
	SD	9.19		9.92	
	g[1]	0.20		0.30	
Sex[2] (girl=1; boy=0)	$\bar{X}$	0.45		0.71	
Ethnic Group[2] (white=1; non-white=0)	$\bar{X}$	0.84		0.90	
		Analysis Year		Analysis Year	
		SP72	SP73	SP72	SP73
Pretest (Nat'l Norm =497 for SP72; Interpolated Nat'l Norm=531.5 for SP73)	$\bar{X}$	533.85	496.83	544.54	601.24
	SD	64.10	56.05	68.55	69.88
	g	0.39	0.66	0.18	0.16
Posttest (Interpolated Nat'l Norm =531.5 for SP72; Nat'l Norm=557 for SP73)	$\bar{X}$	496.83	464.98	601.24	659.89
	SD	56.05	60.88	69.88	75.59
	g	0.66	0.27	0.15	0.39
Posttest Residualized for Pretest and SES	$\bar{X}$	-46.29	-53.70	48.80	48.49
	SD	22.61	31.96	20.87	24.46
	g	-1.66	-1.84	0.91	1.35
Attitude toward Language Arts at Time of Prestest	$\bar{X}$	101.44	98.35	101.99	102.08
	SD	-.21	10.55	10.43	8.97
	g	-0.10	0.10	-0.25	-0.32

(continued)

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[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is that group's mean on variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-I-57 (continued)

Variable		Consistent Underachievers		Consistent Overachievers	
		SP72	SP73	SP72	SP73
Attitude toward Language Arts at Time of Posttest	$\bar{X}$	98.35	100.69	102.08	104.38
	SD	10.55	9.17	8.97	8.35
	g	0.10	-0.23	-0.32	-0.48
Utilization of Objectives	$\bar{X}$	2.31	2.44	2.43	2.39
	SD	0.83	0.59	0.70	0.67
Individualization in Decision Making	$\bar{X}$	1.24	1.22	1.27	1.22
	SD	0.25	0.30	0.32	0.28
Teacher or Locally Developed Materials	$\bar{X}$	2.36	2.57	2.39	2.41
	SD	0.65	0.47	0.59	0.51
Individualization of Instructional Pace	$\bar{X}$	2.06	1.94	1.93	1.86
	SD	0.74	0.65	0.80	0.77
Scheduling Characteristics	$\bar{X}$	1.76	1.57	1.77	1.61
	SD	0.85	0.64	0.80	0.62
Use of Performance Agreements	$\bar{X}$	1.51	1.71	1.38	1.46
	SD	0.64	0.81	0.59	0.65
Classroom Group Organization	$\bar{X}$	2.00	1.92	2.01	1.93
	SD	0.40	0.27	0.36	0.31
Teaching Unit Composition	$\bar{X}$	1.70	0.62	1.62	1.64
	SD	0.59	0.62	0.63	0.67
Completeness of Instructional Package	$\bar{X}$	1.95	1.99	1.91	1.80
	SD	0.59	0.63	0.67	0.69
Utilization of Student Evaluation	$\bar{X}$	2.32	2.14	2.32	2.26
	SD	0.71	0.86	0.77	0.82
Level of Innovation	$\bar{X}$	19.20	19.14	19.02	18.57
	SD	4.73	4.27	4.95	4.76

(continued)

TABLE V-I-57 (continued)

Variable		Consistent Underachievers SP72	Consistent Underachievers SP73	Consistent Overachievers SP72	Consistent Overachievers SP73
Degree of Individualization	$\bar{X}$	7.13	7.01	7.29	6.80
Number of School Days per Year	$\bar{X}$	181.22	181.39	182.03	182.49
	SD	4.79	4.92	6.04	6.03
Number of Minutes per Day	$\bar{X}$	56.33	50.82	56.23	51.30
	SD	10.24	7.52	10.37	7.40
Teacher/Student Contact Ratio[3]	$\bar{X}$	*	3.46		3.29
	SD		0.63		0.50
Number of Teachers	$\bar{X}$	1.98	3.10	2.22	2.33
	SD	1.66	2.41	2.05	2.32
Teacher's Age	$\bar{X}$	33.71	37.67	33.01	38.50
	SD	9.49	9.00	10.90	10.01
Teacher's Socioeconomic Background	$\bar{X}$	105.52	102.32	105.96	99.63
	SD	8.90	8.59	7.72	9.86
Teaching Qualifications	$\bar{X}$	96.42	99.17	96.14	101.20
	SD	8.30	6.46	7.39	5.66

[3] Relative measure of teacher/student contact equal to the percent of teacher time per individual student

*Note: Blank entries indicate no data collected.

APPENDIX V-J

Posttest/Norm and Pretest/Norm Comparisons - Arithmetic Total Score Analyses

TABLE V-J-1

Posttest/Norm and Pretest/Norm Comparisons - Arithmetic Total Score Analyses

	Cohort 1		Cohort 4		Cohort 6	
	SP72	SP73	SP72	SP73	SP72	SP73
Posttest Mean/ Norm Difference[1]	17.02	19.79	6.66	4.84	.80	-7.19
Posttest Difference Ratio[2]	.44	.47	.12	.08	.01	-.10
Pretest Mean/ Norm Difference[1]	*	16.15	4.69	9.44	11.46	7.67
Pretest Difference Ratio[3]	*	.43	.12	.17	.20	.11

[1] Norm based on 50th percentile for spring testing.

[2] $\frac{\bar{X}_{posttest} - Norm}{SD_{posttest}}$

[3] $\frac{\bar{X}_{pretest} - Norm}{SD_{pretest}}$

*CTMM was used.

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APPENDIX V-K

Maximum Possible Posttest and Pretest Mean Shifts Attributable to Test Topout Effects - Arithmetic Total Score Analyses

TABLE V-K-1

Maximum Possible Posttest and Pretest Mean Shifts Attributable to Test Topout Effects - Arithmetic Total Score Analyses

Cohort Analysis Sample[1]	Analysis Sample			Analysis Sample and Topouts[2]			Mean Difference[3]	
	$\bar{X}_{posttest}$	$\bar{X}_{pretest}$	N	$\bar{X}_{posttest}$	$\bar{X}_{pretest}$	N	Posttest	Pretest
Cohort 1, SP73[4]	377.79	319.15	741	379.74	322.05	753	1.95	2.90
Cohort 4, SP72	446.66	404.69	1943	453.50	407.87	2010	6.84	3.18
Cohort 4, SP73	480.84	449.44	1964	484.83	545.27	2012	3.99	4.83
Cohort 6, SP72	510.30	487.46	1443	518.84	493.25	1497	8.54	5.79
Cohort 6, SP73	537.81	517.17	1505	545.45	526.26	1567	7.64	9.09

[1] Cohort 1, SP72 is not included because the pretest was the CTMM and the posttest, the CTBS.

[2] Means shown here were computed assuming that students who topped out obtained the maximum pretest and posttest scores.

[3] Absolute value of the difference.

[4] No topouts in this sample.

APPENDIX V-L

Commonality Analysis of SES -- Arithmetic Total Score Analyses

TABLE V-L-1

Commonality Analysis of SES -- Cohort 1, Spring 1972, Arithmetic Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.02706	.33150	.00130
C(P,D)	.00901	.00901	
C(P,T)	.00004		.00004
C(D,T)		.05004	.05004
C(P,D,T)	-.00732	-.00732	-.00732
$R^2(X_i)$	.02878	.38323	.04406

$R^2(P,D,T) = .41162$

TABLE V-L-2

Commonality Analysis of SES -- Cohort 1, Spring 1973, Arithmetic Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.03532	.30089	.00242
C(P,D)	.05365	.05365	
C(P,T)	-.00013		-.00013
C(D,T)		.04079	.04079
C(P,D,T)	.01650	.01650	.01650
$R^2(X_i)$	.10534	.41183	.05958

$R^2(P,D,T) = .44944$

TABLE V-L-3

Commonality Analysis of SES -- Cohort 4, Spring 1972, Arithmetic Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.02514	.33693	.00169
C(P,D)	.03607	.03607	
C(P,T)	-.00009		-.00009
C(D,T)		.10316	.10316
C(P,D,T)	.02547	.02547	.02547
$R^2(X_i)$	.08658	.50162	.13022

$R^2(P,D,T) = .52836$

TABLE V-L-4

Commonality Analysis of SES - Cohort 4, Spring 1973, Arithmetic Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.01855	.34311	.00044
C(P,D)	.04374	.04374	
C(P,T)	.00047		.00047
C(D,T)		.11086	.11086
C(P,D,T)	.02744	.02744	.02744
$R^2(X_i)$	.09020	.52516	.13921

$R^2(P,D,T) = .54461$

TABLE V-L-5

Commonality Analysis of SES -- Cohort 6, Spring 1972, Arithmetic Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.02771	.23144	.00228
C(P,D)	.06119	.06119	
C(P,T)	-.00035		-.00035
C(D,T)		.00568	.00568
C(P,D,T)	-.00097	-.00097	-.00097
$R^2(X_i)$	.08758	.29734	.00664

$R^2(P,D,T) = .32698$

TABLE V-L-6

Commonality Analysis of SES -- Cohort 6, Spring 1973, Arithmetic Total Score Analysis

	Pretest (P)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.02116	.26645	.01105
C(P,D)	.05837	.05837	
C(P,T)	.00367		.00367
C(D,T)		-.00055	-.00055
C(P,D,T)	-.00829	-.00829	-.00829
$R^2(X_i)$	.07491	.31598	.00588

$R^2(P,D,T) = .35186$

APPENDIX V-M

Commonality Analyses of Pretest -- Arithmetic Total Score Analyses

TABLE V-M-1

Commonality Analysis of Pretest -- Cohort 1, Spring 1972, Arithmetic Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.04025	.07648	.00035
C(S,D)	-.00294	-.00294	
C(S,T)	-.00002		-.00002
C(D,T)		.01933	.01933
C(S,D,T)	-.00851	-.00851	-.00851
$R^2(X_i)$	.02878	.08437	.01115

$R^2(S,D,T) = .12495$

TABLE V-M-2

Commonality Analysis of Pretest -- Cohort 1, Spring 1973, Arithmetic Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.05224	.07328	.00728
C(S,D)	.04051	.04051	
C(S,T)	.00005		.00005
C(D,T)		-.00025	-.00025
C(S,D,T)	.01254	.01254	.01254
$R^2(X_i)$	.10534	.12608	.01962

$R^2(S,D,T) = .18565$

TABLE V-M-3

Commonality Analysis of Pretest -- Cohort 4, Spring 1972, Arithmetic Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.04359	.08914	.00416
C(S,D)	.02507	.02507	
C(S,T)	-.00009		-.00009
C(D,T)		.00219	.00219
C(S,D,T)	.01801	.01801	.01801
$R^2(X_i)$	.08658	.13440	.02427

$R^2(S,D,T) = .18206$

TABLE V-M-4

Commonality Analysis of Pretest — Cohort 4, Spring 1973, Arithmetic Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.03071	.14458	.01619
C(S,D)	.03938	.03938	
C(S,T)	.00142		.00142
C(D,T)		-.00498	-.00498
C(S,D,T)	.01869	.01869	.01869
$R^2(X_i)$	.09020	.19767	.03131

$R^2(S,D,T) = .24599$

TABLE V-M-5

Commonality Analysis of Pretest --
Cohort 6, Spring 1972, Arithmetic Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.03495	.05457	.01204
C(S,D)	.05384	.05384	
C(S,T)	-.00007		-.00007
C(D,T)		-.00298	-.00298
C(S,D,T)	-.00114	-.00114	-.00114
$R^2(X_i)$	.08758	.10429	.00785

$R^2(S,D,T) = .15121$

TABLE V-M-6

Commonality Analysis of Pretest --
Cohort 6, Spring 1973, Arithmetic Total Score Analysis

	SES(S)	EdExAG Dummy Codes(D)	Teacher Variables(T)
$U(X_i)$	.02409	.16775	.00710
C(S,D)	.05466	.05466	
C(S,T)	.00397		.00397
C(D,T)		.01234	.01234
C(S,D,T)	-.00781	-.00781	-.00781
$R^2(X_i)$	.07491	.22694	.01559

$R^2(S,D,T) = .26210$

Appendix V-N

Intercorrelations Among All Key Analysis Variables -- Arithmetic Total Score Analyses *

*Variable names for the abbreviations used are found in Appendix IV H. Methods to be used for testing the statistical significance of these correlations vary depending upon whether or not the variables were measured at the student level or at the EdExAG group level. These issues are discussed in Chapter IV and in Appendix IV-E.

Critical values for the correlations of the EdExAG variables with SES, pretest and posttest are found in Chapter V in the body of the report as are the critical values for correlation among the student level variables. Critical values for intercorrelations of EdExAG-level variables with EdExAG-level variables are noted on each of the following tables, along with the effective sample size, k_{eff} (see Appendix IV-E). EdExAG variable correlations exceeding the noted value are statistically significant at $p<.05$ (two-tailed) with $(k_{eff}-2)$ degrees of freedom.

TABLE V-N-1

Intercorrelations among the Key Analysis Variables -- Cohort 1, Spring, 1972 Arith. Total Score Analysis

[r $(p<.05)$ = ,576 , k_{eff} = 12]

	RESM72	COMPSES	RESM71	SUM04	SUM10	E2NMIN	T2TQ	E2UO	E2IDM	E2TLDM	E2IIP	E2SC
RESM72	1.00000	0.34297	0.39829	-0.00585	0.01815	0.03993	0.00975	0.03647	-0.06787	0.07158	0.04226	0.03400
COMPSES	0.34297	1.00000	0.16965	0.13657	0.19633	-0.10143	0.15248	0.30387	0.03974	0.18905	0.12317	-0.03829
RESM71	0.39829	0.16965	1.00000	0.03011	0.04727	0.17920	-0.03317	0.06977	-0.01639	-0.05194	0.03644	0.05508
SUM04	-0.00585	0.13657	0.03011	1.00000	0.92279	-0.22950	0.12375	0.77737	0.63724	0.20017	0.67352	0.72924
SUM10	0.01815	0.19633	0.04727	0.92279	1.00000	-0.25944	-0.00238	0.83918	0.58058	0.39996	0.52614	0.77485
E2NMIN	0.03993	-0.10143	0.17920	-0.22950	-0.25944	1.00000	-0.11088	-0.19142	-0.14645	-0.11461	-0.15961	0.02005
T2TQ	0.00975	0.15248	-0.03317	0.12375	-0.00238	-0.11088	1.00000	0.05152	0.06723	-0.12916	0.13345	-0.12177
E2UO	0.03647	0.30387	0.06977	0.77737	0.83918	-0.19142	0.05152	1.00000	0.35128	0.10035	0.62978	0.47349
E2IDM	-0.06787	0.03974	-0.01639	0.63724	0.53053	-0.14645	0.06723	0.35128	1.00000	0.21864	0.14891	0.45317
E2TLDM	0.07158	0.18905	-0.05194	0.20017	0.39996	-0.11461	-0.12916	0.10035	0.21864	1.00000	-0.36923	0.22821
E2IIP	0.04226	0.12317	0.03644	0.67352	0.52614	-0.15961	0.13345	0.62978	0.14891	-0.36923	1.00000	0.50141
E2SC	0.03400	-0.03829	0.05508	0.72924	0.77485	0.02005	-0.12177	0.47349	0.45317	0.22821	0.50141	1.00000
E2UPA	-0.02368	-0.04420	0.02525	0.82466	0.82231	-0.15097	0.00668	0.49276	0.53301	0.33352	0.36748	0.85698
E2CGO	-0.08342	-0.11004	0.14448	0.35942	0.40968	-0.07081	-0.07916	0.44672	0.23526	-0.31764	0.26957	0.29422
E2TUC	0.00743	0.28222	0.04448	0.42309	0.66034	-0.36046	-0.05734	0.52248	0.42845	0.63088	-0.14355	0.26055
E2CIP	0.07716	0.21544	-0.08960	0.45397	0.54903	-0.24726	-0.02582	0.40200	0.16365	0.51660	0.39227	0.51875
E2USE	0.00847	0.25722	0.02910	0.74022	0.73401	-0.20250	0.13932	0.70783	0.35503	0.48049	0.27336	0.27996
T2AGE	-0.09435	-0.00605	0.04048	0.18471	0.04441	0.02919	0.62106	0.07308	0.00435	-0.24719	0.19194	0.02139
T2TSB	0.04580	-0.02818	0.02752	-0.27694	-0.20291	0.20529	-0.17265	-0.07364	-0.24962	-0.08405	-0.13395	-0.10345
PCT71	0.13303	0.47128	0.00000	-0.08340	-0.07062	-0.11487	0.31151	0.27687	-0.26777	-0.04387	0.14707	-0.43684
PCT72	-0.00000	0.09536	0.01861	-0.24794	-0.34418	0.10073	0.23731	0.11215	-0.42896	-0.65191	0.27082	-0.43098
MANL71	0.41526	0.24831	0.98505	0.01529	0.03440	0.15673	0.02099	0.11643	-0.06228	-0.05872	0.06123	-0.02100
MTOT72	0.97738	0.35538	0.39322	-0.05816	-0.05506	0.11898	0.05972	0.05936	-0.15706	-0.06792	0.09859	-0.05792

	E2UPA	E2CGO	E2TUC	E2CIP	E2USE	T2AGE	T2TSB	PCT71	PCT72	MANL71	MTOT72
RESM72	-0.02368	-0.08342	0.00743	0.07716	0.00847	-0.09435	0.04580	0.13303	-0.00000	0.41526	0.97738
COMPSES	-0.04420	-0.11004	0.28222	0.21544	0.25722	-0.00605	-0.02818	0.47128	0.09536	0.24831	0.35538
RESM71	0.02525	0.14448	0.04448	-0.08960	0.02910	0.04048	0.02752	0.00000	0.01861	0.98505	0.39322
SUM04	0.82466	0.35942	0.42309	0.45397	0.74022	0.18471	-0.27694	-0.08340	-0.24794	0.01529	-0.05816
SUM10	0.82231	0.40968	0.66034	0.54903	0.73401	0.04441	-0.20291	-0.07062	-0.34418	0.03440	-0.05506
E2NMIN	-0.15097	-0.07081	-0.36046	-0.24726	-0.20250	0.02919	0.20529	-0.11487	0.10073	0.15673	0.11898
T2TQ	0.00668	-0.07916	-0.05734	-0.02582	0.13932	0.62106	-0.17265	0.31151	0.23731	0.02099	0.05972
E2UO	0.49276	0.44672	0.52248	0.40200	0.70783	0.07308	-0.07364	0.27687	0.11215	0.11643	0.05936
E2IDM	0.53301	0.23526	0.42845	0.16365	0.35503	0.00435	-0.24962	-0.26777	-0.42896	-0.06228	-0.15706
E2TLDM	0.33352	-0.31764	0.63088	0.51660	0.48049	-0.24719	-0.08405	-0.04387	-0.65191	-0.05872	-0.06792
E2IIP	0.36748	0.26957	-0.14355	0.39227	0.27336	0.19194	-0.13395	0.14707	0.27082	0.06123	0.09859
E2SC	0.85698	0.29422	0.26055	0.51875	0.27996	0.02139	-0.10345	-0.43684	-0.43098	-0.02100	-0.05792
E2UPA	1.00000	0.33864	0.41320	0.40956	0.49515	0.12776	-0.15395	-0.42490	-0.49783	-0.04833	-0.12844
E2CGO	0.33864	1.00000	0.30653	-0.38491	0.18832	0.15222	-0.04841	-0.13276	0.16416	0.11944	-0.04681
E2TUC	0.41320	0.30653	1.00000	0.21268	0.61675	-0.08428	-0.14021	0.08913	-0.45439	0.05918	-0.08884
E2CIP	0.40956	-0.38491	0.21268	1.00000	0.29320	-0.20113	-0.07445	0.00651	-0.34206	-0.08714	0.00307
E2USE	0.49515	0.18832	0.61675	0.29320	1.00000	0.16641	-0.28655	0.22057	-0.18758	0.06667	-0.03140
T2AGE	0.12776	0.15222	-0.08428	-0.20113	0.16641	1.00000	-0.44844	0.11893	0.23237	0.06037	-0.04307
T2TSB	-0.15395	-0.04841	-0.14021	-0.07445	-0.28655	-0.44844	1.00000	0.03446	0.20232	0.03304	0.08756
PCT71	-0.42490	-0.13276	0.08913	0.00651	0.22057	0.11893	0.03446	1.00000	0.65694	0.17229	0.26897
PCT72	-0.49783	0.16416	-0.45439	-0.34206	-0.18758	0.23237	0.20232	0.65694	1.00000	0.13152	0.21150
MANL71	-0.04833	0.11944	0.05918	-0.08714	0.06667	0.06037	0.03304	0.17229	0.13152	1.00000	0.43368
MTOT72	-0.12844	-0.04681	-0.08884	0.00307	-0.03140	-0.04307	0.08756	0.26897	0.21150	0.43368	1.00000

TABLE V-N-2

Intercorrelations among the Key Analysis Variables -- Cohort 1, Spring, 1973 *Arith. Total Score Analysis*

[r (p<.05) = .602 , k_{eff} = 11]

	RESM73	COMPSES	RESM72	SUM04	SUM10	E3MMIN	T3TQ	E3UO	E3IDM	E3TLDM	E3IIP	E3SC
RESM73	1.00000	0.23382	0.72362	-0.06761	-0.12107	0.12040	0.18305	-0.10136	-0.09073	-0.05871	0.00569	-0.15738
COMPSES	0.23382	1.00000	0.32457	0.13407	0.15943	0.13486	0.17330	0.29368	0.05576	-0.07805	0.22944	-0.05984
RESM72	0.72362	0.32457	1.00000	0.03430	0.09537	0.12055	0.13692	0.15127	0.01373	-0.02572	0.07866	-0.02646
SUM04	-0.06761	0.13407	0.09496	1.00000	0.94450	0.27572	-0.09201	0.60658	0.80458	0.24117	0.17080	0.68562
SUM10	-0.12107	0.15943	0.09537	0.94450	1.00000	0.13813	-0.06229	0.74911	0.73452	0.29255	0.10505	0.75197
E3MMIN	0.12040	0.13486	0.12085	0.27572	0.13813	1.00000	0.08492	0.16763	0.03782	-0.24149	0.21051	-0.01299
T3TQ	0.18305	0.17330	0.13602	-0.09201	-0.06229	0.08492	1.00000	-0.02401	-0.17583	0.04863	0.10452	-0.16254
E3UO	-0.10136	0.29368	0.15127	0.60658	0.74911	0.16763	-0.02401	1.00000	0.36215	-0.21578	0.28015	0.44416
E3IDM	-0.09073	0.05576	0.01373	0.80458	0.73452	0.03782	-0.17583	0.36215	1.00000	0.09779	0.09470	0.82276
E3TLDM	-0.05871	-0.07805	-0.02572	0.24117	0.29255	-0.24149	0.04863	-0.21578	0.09779	1.00000	-0.47322	0.14628
E3IIP	0.00569	0.22944	0.07866	0.17080	0.10505	0.21051	0.10452	0.28015	0.09470	-0.47322	1.00000	-0.03458
E3SC	-0.15738	-0.05984	-0.02646	0.68562	0.75197	-0.01299	-0.16254	0.44416	0.82276	0.14628	-0.03458	1.00000
E3UPA	-0.04767	-0.08632	0.03481	0.86797	0.80346	0.25265	-0.11611	0.42304	0.64161	0.33311	-0.10413	0.61693
E3CGO	-0.04219	-0.13044	0.02558	0.10837	0.11828	0.00606	-0.23721	0.35587	0.29235	-0.66465	0.27766	0.43120
E3TUC	-0.08695	0.17685	0.08279	0.52777	0.67196	-0.03406	0.03816	0.55322	0.25923	0.49162	-0.43369	0.30911
E3CIP	-0.05783	0.28535	0.07709	0.60387	0.61534	0.15964	0.13696	0.43270	0.27945	0.33128	0.54295	0.18062
E3USE	-0.02777	0.28068	0.13426	0.46084	0.53737	0.08958	0.01895	0.43089	0.14534	0.44259	-0.28682	0.13403
T3AGE	0.08345	-0.03694	0.05186	-0.08543	-0.02861	-0.06499	0.58108	-0.02560	-0.05614	0.02840	-0.35103	0.12000
T3TSB	-0.02679	0.05513	0.00459	-0.13963	-0.13751	-0.17496	-0.00317	0.07335	-0.15352	-0.32859	0.51424	-0.14352
PCT72	0.03298	0.07470	-0.00000	-0.61240	-0.58588	-0.08164	0.02542	-0.01151	-0.53056	-0.80391	0.30697	-0.45382
PCT73	0.00000	0.47557	0.11383	0.00819	0.12760	-0.07372	0.20788	0.31985	-0.03935	0.12510	-0.04760	-0.22720
MTOT72	0.71639	0.33288	0.98123	-0.02499	-0.01942	0.10283	0.13837	0.14621	-0.08885	-0.18029	0.13638	-0.11349
MTOT73	0.39669	0.27171	0.73048	-0.06672	-0.11029	0.11401	0.19934	-0.07502	-0.09363	-0.04835	0.00180	-0.17533

	E3UPA	E3CGO	E3TUC	E3CIP	E3USE	T3AGE	T3TSB	PCT72	PCT73	MTOT72	MTOT73
RESM73	-0.04767	-0.04219	-0.08695	-0.05783	-0.02777	0.08345	-0.02679	0.03298	0.00000	0.71639	0.39669
COMPSES	-0.08632	-0.13044	0.17685	0.28535	0.28068	-0.03634	0.05513	0.07470	0.47557	0.33288	0.27171
RESM72	0.03481	0.02558	0.08279	0.07709	0.13426	0.05186	0.00459	-0.00000	0.11383	0.98123	0.73048
SUM04	0.86797	0.10837	0.52777	0.60387	0.46084	-0.08543	-0.13963	-0.61240	0.00819	-0.02499	-0.06672
SUM10	0.80346	0.11828	0.67196	0.61534	0.53737	-0.02861	-0.13751	-0.58588	0.12760	-0.01942	-0.11029
E3MMIN	0.25265	0.00606	-0.03406	0.15964	0.08958	-0.06499	-0.17496	-0.08164	-0.07372	0.10283	0.11401
T3TQ	-0.11611	-0.23721	0.03816	0.13696	0.01895	0.58108	-0.00317	0.02542	0.20788	0.13837	0.19934
E3UO	0.42304	0.35537	0.55322	0.43270	0.43089	-0.02560	0.07335	-0.01151	0.31935	0.14621	-0.07502
E3IDM	0.64161	0.29235	0.25923	0.27945	0.14534	-0.05514	-0.15352	-0.53056	-0.03935	-0.08885	-0.09363
E3TLDM	0.33311	-0.66465	0.49162	0.33128	0.44259	0.02840	-0.32859	-0.80391	0.12510	-0.13029	-0.04835
E3IIP	-0.10413	0.27766	-0.43369	0.54295	-0.28682	-0.35103	0.51424	0.30697	-0.04760	0.13638	0.00180
E3SC	0.61693	0.43120	0.30911	0.18062	0.13403	0.12000	-0.14352	-0.45382	-0.22720	-0.11349	-0.17533
E3UPA	1.00000	0.08002	0.49204	0.39649	0.25677	0.07598	-0.23288	-0.67378	-0.24422	-0.09579	-0.06737
E3CGO	0.08002	1.00000	-0.33210	-0.36432	-0.35835	0.03253	0.18629	0.38278	-0.46510	0.09893	-0.07986
E3TUC	0.49204	-0.33210	1.00000	0.31909	0.80559	0.14197	-0.34326	-0.49410	0.51630	-0.01406	-0.04468
E3CIP	0.39649	-0.36432	0.31909	1.00000	0.32550	-0.26317	0.13663	-0.41934	0.29687	-0.00523	-0.03350
E3USE	0.25677	-0.35835	0.80559	0.32550	1.00000	-0.01684	-0.29701	-0.35731	0.51933	0.06283	0.01454
T3AGE	0.07598	0.03253	0.14197	-0.26317	-0.01684	1.00000	-0.12373	0.06468	-0.07031	0.06336	0.08343
T3TSB	-0.23288	0.18629	-0.34326	0.13663	-0.29701	-0.12373	1.00000	0.46924	-0.16378	0.09500	-0.04001
PCT72	-0.67378	0.38278	-0.49410	-0.41934	-0.35731	0.06468	0.46924	1.00000	-0.03701	0.19286	0.02987
PCT73	-0.24422	-0.46510	0.51630	0.29687	0.51933	-0.07031	-0.16378	-0.03701	1.00000	0.10455	0.08130
MTOT72	-0.09579	0.09893	-0.01406	-0.00523	0.06283	0.06336	0.09500	0.19286	0.10455	1.00000	0.72252
MTOT73	-0.06737	-0.07986	-0.04468	-0.03350	0.01454	0.08343	-0.04001	0.02987	0.08130	0.72252	1.00000

TABLE V-N-3

Intercorrelations among the Key Analysis Variables -- Cohort 4, Spring, 1972 Arith. Total Score Analysis

[r ($p<.05$) = .404 , k_{eff} = 24]

	RESM72	COMPSES	RESM71	SUM04	SUM10	E2MMIN	T2TQ	E2UO	E21DM	E2TLDM	E21IP	E2SC
RESM72	1.00000	0.30035	0.79332	-0.06459	-0.06476	-0.05704	-0.03970	-0.04965	-0.04613	0.03309	-0.16470	-0.00011
COMPSES	0.30035	1.00000	0.29424	0.00103	0.03539	-0.05329	-0.17117	0.10432	0.03639	0.06786	-0.07811	0.07052
RESM71	0.79332	0.29424	1.00000	-0.05347	-0.10009	-0.06116	-0.00676	-0.08056	-0.02601	0.00700	-0.13556	-0.03457
SUM04	-0.06459	0.00103	-0.05347	1.00000	0.81331	0.00190	-0.15235	0.60403	0.65518	0.18248	0.80292	0.29645
SUM10	-0.06476	0.03539	-0.10009	0.81331	1.00000	0.01643	-0.24322	0.78576	0.52737	0.36764	0.68979	0.48908
E2MMIN	-0.05704	-0.05329	-0.06116	0.00190	0.01643	1.00000	0.02989	0.14783	-0.04049	0.09015	0.03752	0.14876
T2TQ	-0.03970	-0.17117	-0.00676	-0.15235	-0.24322	0.02989	1.00000	-0.27878	-0.04824	-0.00938	-0.14064	-0.26779
E2UO	-0.04965	0.10432	-0.08056	0.60403	0.78576	0.14783	-0.27878	1.00000	0.22596	0.20033	0.52351	0.44674
E21DM	-0.04613	0.03639	-0.02601	0.65518	0.52737	-0.04049	-0.04824	0.22596	1.00000	-0.05653	0.40874	0.19790
E2TLDM	0.03309	0.06786	0.00700	0.13248	0.36764	0.09015	-0.00938	0.20033	-0.05653	1.00000	0.01118	0.25853
E21IP	-0.16470	-0.07811	-0.13556	0.80292	0.68979	0.03752	-0.14064	0.52351	0.40874	0.01118	1.00000	0.16900
E2SC	-0.00011	0.07052	-0.03457	0.29645	0.48908	0.14876	-0.26779	0.44674	0.19790	0.25853	0.16900	1.00000
E2UPA	-0.03657	-0.08752	-0.03613	0.82844	0.70094	-0.03963	-0.20167	0.37183	0.50997	0.05180	0.57711	0.20131
E2CGO	-0.06539	-0.11775	-0.08838	0.44095	0.52731	-0.01720	-0.04350	0.41233	0.29846	0.00770	0.40718	0.01804
E2TUC	0.02381	0.08911	-0.06900	0.31209	0.49032	-0.26277	-0.17028	0.10631	0.30110	0.14564	0.08055	0.10287
E2CIP	-0.14214	-0.03155	-0.15194	0.61630	0.64733	0.00428	-0.16903	0.53323	0.29187	0.16098	0.61538	0.18538
E2USE	0.07896	0.18014	0.06353	0.49198	0.56165	0.04148	0.00725	0.53615	0.10274	0.49572	0.18082	0.27967
T2AGE	-0.06517	-0.24977	-0.08512	-0.16091	-0.19927	0.09683	0.67872	-0.20488	-0.09098	-0.17369	-0.03880	-0.24837
T2TSG	0.15875	0.34035	0.12818	-0.05358	0.08197	0.11143	-0.36382	0.22305	-0.12037	0.31927	-0.13405	0.15206
PCT71	0.03391	-0.05166	0.00001	-0.28767	-0.19839	0.02794	0.10139	-0.00890	-0.45990	0.01224	-0.11636	-0.31100
PCT72	-0.00002	-0.07771	-0.03336	-0.31383	-0.26428	0.13864	-0.05439	0.04135	-0.48434	-0.33144	-0.11306	-0.15560
MTOT71	0.79395	0.29271	0.99962	-0.06137	-0.10551	-0.06037	-0.00396	-0.08078	-0.03866	0.00733	-0.13871	-0.04312
MTOT72	0.99911	0.30336	0.79402	-0.05128	-0.05354	-0.06285	-0.03737	-0.05135	-0.02564	0.04705	-0.15977	0.00646

	E2UPA	E2CGO	E2TUC	E2CIP	E2USE	T2AGE	T2TSG	PCT71	PCT72	MTOT71	MTOT72
RESM72	-0.03657	-0.06539	0.02381	-0.14214	0.07896	-0.06517	0.15875	0.03391	-0.00002	0.79395	0.99911
COMPSES	-0.08752	-0.11775	0.08911	-0.03155	0.18014	-0.24977	0.34035	-0.05166	-0.07771	0.29271	0.30336
RESM71	-0.03613	-0.08838	-0.06900	-0.15194	0.06353	-0.08512	0.12818	0.00001	-0.03336	0.99962	0.79402
SUM04	0.82844	0.44095	0.31209	0.61630	0.49198	-0.16091	-0.05358	-0.28767	-0.31383	-0.06137	-0.05128
SUM10	0.70094	0.52331	0.49032	0.64733	0.56165	-0.19927	0.08197	-0.19339	-0.26428	-0.10551	-0.05354
E2MMIN	-0.03963	-0.01720	-0.26277	0.00423	0.04148	0.09683	0.11143	0.02794	0.13864	-0.06037	-0.06285
T2TQ	-0.20167	-0.04350	-0.17028	-0.16903	0.00725	0.67872	-0.36382	0.10139	-0.05433	-0.00396	-0.03737
E2UO	0.37183	0.41233	0.13631	0.53323	0.53615	-0.20438	0.22305	-0.00890	0.04135	-0.08078	-0.05135
E21DM	0.50997	0.29346	0.37110	0.29187	0.10274	-0.09098	-0.12037	-0.45990	-0.48434	-0.03866	-0.02564
E2TLDM	0.05180	0.00770	0.14564	0.16093	0.49572	-0.17369	0.31927	0.01224	-0.33144	0.00733	0.04705
E21IP	0.57711	0.40718	0.08055	0.61538	0.18082	-0.03880	-0.13405	-0.11636	-0.11306	-0.13871	-0.15977
E2SC	0.20131	0.01804	0.10287	0.18538	0.27967	-0.24837	0.15206	-0.31100	-0.15560	-0.04312	0.00646
E2UPA	1.00000	0.41307	0.23225	0.54557	0.12851	-0.03784	-0.10500	-0.23712	-0.30391	-0.04402	-0.02370
E2CGO	0.41807	1.00000	0.25155	0.03925	0.08130	0.11340	-0.14535	0.11868	0.01450	-0.08509	-0.06595
E2TUC	0.23225	0.25155	1.00000	0.18460	0.31588	-0.17173	0.05329	-0.09472	-0.13772	-0.07158	0.03171
E2CIP	0.54557	0.03925	0.18460	1.00000	0.19726	-0.02059	0.02500	-0.12261	-0.15276	-0.15526	-0.13556
E2USE	0.12851	0.08130	0.31588	0.19726	1.00000	-0.25172	0.20094	-0.02202	-0.06405	0.06290	0.08160
T2AGE	-0.03784	0.11340	-0.17173	-0.02059	-0.25172	1.00000	-0.42328	0.21575	0.18028	-0.07915	-0.07272
T2TSG	-0.10500	-0.14535	0.05329	0.02500	0.20094	-0.42328	1.00000	-0.02749	-0.10557	0.12738	0.16307
PCT71	-0.23712	0.11868	-0.09472	-0.12261	-0.02202	0.21575	-0.02749	1.00000	0.71364	0.02753	0.00374
PCT72	-0.30391	0.01450	-0.13772	-0.15276	-0.06405	0.18028	-0.10557	0.71364	1.00000	-0.01371	-0.04225
MTOT71	-0.04402	-0.08509	-0.07158	-0.15526	0.06290	-0.07915	0.12738	0.02753	-0.01371	1.00000	0.79382
MTOT72	-0.02370	-0.06595	0.03171	-0.13556	0.08160	-0.07272	0.16307	0.00374	-0.04225	0.79382	1.00000

TABLE V-N-4

Intercorrelations among the Key Analysis Variables -- Cohort 4, Spring, 1973 Arith. Total Score Analysis

[r ($p<.05$) = ±.404 , k_{eff} = 24]

	RESM73	COMPSES	RESM72	SUM04	SUM10	E3NMIN	T3TO	E3UO	E3IDM	E3TLDM	E3IIP	E3SC
RESM73	1.00000	0.31081	0.81639	-0.18049	-0.23207	-0.01315	0.05487	-0.11093	-0.04501	-0.11051	-0.24283	-0.08951
COMPSES	0.31081	1.00000	0.30034	-0.07905	-0.10442	-0.12670	-0.03741	0.05030	0.01517	-0.11132	-0.15446	0.02056
RESM72	0.81639	0.30034	1.00000	-0.19066	-0.23862	-0.00202	0.08392	-0.06220	-0.05375	-0.07822	-0.24941	-0.12016
SUM04	-0.18049	-0.07905	-0.19066	1.00000	0.93934	0.09059	-0.18199	0.68917	0.41324	0.25136	0.79939	0.41892
SUM10	-0.23207	-0.10442	-0.23862	0.93934	1.00000	0.12476	-0.14087	0.75980	0.41118	0.35595	0.83118	0.49202
E3NMIN	-0.01315	-0.12670	-0.00202	0.09059	0.12476	1.00000	0.10989	0.19531	-0.09441	0.18406	0.19776	-0.10347
T3TO	0.05487	-0.03741	0.08392	-0.18199	-0.14087	0.10989	1.00000	-0.01968	-0.30579	0.01419	-0.02761	-0.28098
E3UO	-0.11093	0.05030	-0.06220	0.68917	0.75980	0.19531	-0.01968	1.00000	0.23544	0.20414	0.59853	0.24280
E3IDM	-0.04501	0.01517	-0.05375	0.41324	0.41118	-0.09441	-0.30579	0.23544	1.00000	-0.17018	0.10990	0.61701
E3TLDM	-0.11051	-0.11132	-0.07822	0.25136	0.35595	0.18406	0.01419	0.20414	-0.17018	1.00000	0.42454	-0.23560
E3IIP	-0.24283	-0.15446	-0.24941	0.79939	0.83118	0.19776	-0.02761	0.59853	0.10990	0.42454	1.00000	0.12485
E3SC	-0.08951	0.02056	-0.12016	0.41892	0.49202	-0.10347	-0.28098	0.24280	0.61701	-0.23560	0.12485	1.00000
E3UPA	-0.10226	-0.00553	-0.13592	0.80194	0.66542	-0.03079	-0.26746	0.38650	0.34184	-0.06917	0.44296	0.49334
E3CGO	-0.12722	-0.05908	-0.19074	0.54778	0.54554	0.02674	-0.12155	0.27697	0.46921	-0.31045	0.39065	0.53933
E3TUC	-0.19150	-0.12491	-0.20521	0.30925	0.53148	-0.00660	0.04212	0.35509	0.13016	0.40278	0.35523	0.24209
E3CIP	-0.26952	-0.20153	-0.24843	0.62724	0.69423	0.19976	0.02354	0.52137	-0.01034	0.49507	0.88844	-0.04709
E3USE	-0.04360	-0.03781	-0.00728	0.52484	0.50403	0.12633	0.09073	0.59387	-0.05910	0.43701	0.37744	-0.04025
T3AGE	-0.03984	-0.18223	-0.01827	0.02635	0.03116	0.22554	0.58661	0.07439	-0.28121	-0.06745	0.12436	-0.17498
T3TSR	0.14414	0.34910	0.12637	-0.07979	-0.09805	-0.23443	-0.20095	-0.01653	-0.10384	-0.06942	-0.13607	0.02789
PCT72	-0.06207	-0.06109	-0.00001	-0.28001	-0.18013	0.14624	0.11967	0.00187	-0.21339	0.01017	-0.00032	-0.38600
PCT73	-0.00002	0.21865	0.09502	-0.14364	-0.08950	-0.02777	0.06409	0.12326	-0.16802	-0.05362	0.00008	-0.23052
MTOT72	0.81769	0.30178	0.99968	-0.18355	-0.23401	-0.00570	0.08099	-0.06223	-0.04836	-0.07845	-0.24933	-0.11040
MTOT73	0.99880	0.29973	0.81075	-0.17323	-0.22740	-0.01177	0.05166	-0.11683	-0.03673	-0.10775	-0.24254	-0.07811

	E3UPA	E3CGO	E3TUC	E3CIP	E3USE	T3AGE	T3TSR	PCT72	PCT73	MTOT72	MTOT73
RESM73	-0.10226	-0.12722	-0.19150	-0.26952	-0.04360	-0.03984	0.14414	-0.06207	-0.00002	0.81769	0.99880
COMPSES	-0.00553	-0.05908	-0.12491	-0.20153	-0.03781	-0.18223	0.34910	-0.06109	0.21865	0.30178	0.29973
RESM72	-0.13592	-0.19074	-0.20521	-0.24843	-0.00728	-0.01827	0.12637	-0.00001	0.09502	0.99968	0.81075
SUM04	0.80194	0.54778	0.30925	0.62724	0.52484	0.02635	-0.07979	-0.28001	-0.14364	-0.18355	-0.17323
SUM10	0.66542	0.54554	0.53148	0.69423	0.50403	0.03116	-0.09805	-0.18013	-0.08950	-0.23401	-0.22740
E3NMIN	-0.03079	0.02674	-0.00660	0.19976	0.12633	0.22554	-0.23443	0.14624	-0.02777	-0.00570	-0.01177
T3TO	-0.26746	-0.12155	0.04212	0.02354	0.09073	0.58661	-0.20095	0.11967	0.06409	0.08099	0.05166
E3UO	0.38650	0.27697	0.35509	0.52137	0.59387	0.07439	-0.01653	0.00187	0.12326	-0.06223	-0.11683
E3IDM	0.34184	0.46921	0.13016	-0.01034	-0.05910	-0.28121	-0.10384	-0.21339	-0.16802	-0.04836	-0.03673
E3TLDM	-0.06917	-0.31045	0.40278	0.49507	0.43701	-0.06745	-0.06942	0.01017	-0.05362	-0.07845	-0.10775
E3IIP	0.44296	0.39065	0.35523	0.88844	0.37744	0.12436	-0.13607	-0.00032	0.00008	-0.24933	-0.24254
E3SC	0.49334	0.53933	0.24209	-0.04709	-0.04025	-0.17498	0.02789	-0.38600	-0.23052	-0.11040	-0.07811
E3UPA	1.00000	0.63818	0.03606	0.23146	0.12362	0.05528	0.06976	-0.34298	-0.14329	-0.12724	-0.09512
E3CGO	0.63818	1.00000	-0.00658	0.12557	-0.13070	0.04582	-0.02537	-0.11345	-0.17597	-0.19783	-0.11845
E3TUC	0.03696	-0.00658	1.00000	0.38207	0.34656	0.08837	-0.12560	0.01222	0.12015	-0.20545	-0.19715
E3CIP	0.23146	0.12557	0.38207	1.00000	0.40141	0.13093	-0.17039	0.16181	0.07362	-0.25242	-0.27280
E3USE	0.12362	-0.13070	0.34656	0.40141	1.00000	0.01436	-0.19455	-0.20657	-0.11816	-0.00208	-0.03776
T3AGE	0.05528	0.04582	0.08837	0.13093	0.01436	1.00000	-0.28487	0.21131	0.05686	-0.02359	-0.04257
T3TSR	0.06976	-0.02537	-0.12560	-0.17039	-0.19455	-0.28487	1.00000	-0.12042	0.12757	0.12936	0.13772
PCT72	-0.34298	-0.11345	0.01222	0.16181	-0.20657	0.21131	-0.12042	1.00000	0.68913	-0.02520	-0.09575
PCT73	-0.14329	-0.17597	0.12015	0.07362	-0.11816	0.05686	0.12757	0.68913	1.00000	0.07763	-0.04900
MTOT72	-0.12724	-0.19783	-0.20545	-0.25242	-0.00208	-0.02359	0.12936	-0.02520	0.07763	1.00000	0.81291
MTOT73	-0.09512	-0.11845	-0.19715	-0.27280	-0.03776	-0.04257	0.13772	-0.09575	-0.04900	0.81291	1.00000

TABLE V-N-5

Intercorrelations among the Key Analysis Variables -- Cohort 6, Spring, 1972 Arith. Total Score Analysis

[r (p<.05) = .811 , k_{eff} = 6]

	RESM72	COMPSES	RESM71	SUM04	SUM10	E2NMIN	T2TQ	E2UO	E2IDM	E2TLDM	E2IIP	E2SC
RESM72	1.00000	0.28969	0.81410	0.03453	0.10390	-0.14824	0.00018	0.08956	-0.13333	0.08250	-0.19988	0.28365
COMPSES	0.28969	1.00000	0.29594	-0.22726	-0.10865	-0.17277	0.01367	0.00980	-0.16000	-0.12761	-0.28614	0.44131
RESM71	0.81410	0.29594	1.00000	-0.00560	0.04373	-0.14258	-0.03172	-0.01290	-0.06408	0.02838	-0.22192	0.25616
SUM04	0.03453	-0.22726	-0.00560	1.00000	0.83967	0.09660	-0.16911	0.22070	0.48660	0.13588	-0.01996	-0.23498
SUM10	0.10390	-0.10865	0.04379	0.83967	1.00000	-0.16098	-0.34672	0.49283	0.14872	0.43803	-0.34604	-0.09296
E2NMIN	-0.14824	-0.17277	-0.14258	0.09660	-0.16098	1.00000	-0.24818	-0.01303	0.16383	-0.21435	0.17538	-0.20586
T2TQ	0.00018	0.01367	-0.03172	-0.16911	-0.34672	-0.24818	1.00000	-0.14248	-0.02253	-0.28001	0.45933	0.17597
E2UO	0.08956	0.00980	-0.01290	0.22070	0.49283	-0.01303	-0.14248	1.00000	-0.54593	0.28464	-0.20549	0.18693
E2IDM	-0.13333	-0.16000	-0.06408	0.48660	0.14372	0.16383	-0.02253	-0.54593	1.00000	-0.52323	0.28532	-0.55222
E2TLDM	0.08250	-0.12761	0.02838	0.13588	0.43803	-0.21433	-0.28001	0.28464	-0.52323	1.00000	-0.27596	0.07501
E2IIP	-0.19988	-0.28614	-0.22192	-0.01996	-0.34604	0.17538	0.45933	-0.20549	0.28532	-0.27596	1.00000	-0.45796
E2SC	0.28365	0.44131	0.25616	-0.23498	-0.09296	-0.20586	0.17597	0.13693	-0.55222	0.07501	-0.45796	1.00000
E2UPA	0.12520	-0.05135	0.11894	0.88542	0.76263	0.03283	-0.25044	0.09477	0.41463	0.10274	-0.38987	0.04998
E2CGO	0.02052	0.18694	0.07652	0.09558	0.03331	-0.41180	0.16072	-0.32103	0.62745	-0.66805	-0.06854	-0.08701
E2TUC	-0.21401	-0.35681	-0.17507	0.30936	0.31188	0.21954	-0.44837	-0.22002	0.50899	0.22824	0.14720	-0.85166
E2CIP	-0.13936	-0.40226	-0.21368	0.44206	0.49603	0.32173	-0.29161	0.59639	-0.06987	0.33886	0.15494	-0.58005
E2USE	0.11547	0.05867	0.03021	-0.07456	0.39118	-0.15919	-0.28736	0.78392	-0.78524	0.66769	-0.48436	0.27894
T2AGE	0.00580	-0.03349	-0.06114	-0.00617	-0.21672	-0.17440	0.65584	-0.16910	0.08232	-0.23596	0.40523	0.02658
T2TS3	-0.08767	0.05958	-0.03267	0.19576	0.26649	0.08000	-0.37012	0.06545	0.36532	-0.22600	-0.26640	-0.20475
PCT71	0.06229	0.07905	-0.00009	-0.36829	-0.46834	-0.09366	0.62251	0.16874	-0.51881	-0.06966	0.42167	0.48118
PCT72	0.00035	-0.01076	-0.02839	-0.17795	-0.42484	0.43645	0.37188	-0.12098	-0.21839	-0.02687	0.44125	0.36332
MTOT71	0.81830	0.29635	0.99602	0.02102	0.08326	-0.14571	-0.03649	0.00548	-0.05582	0.04076	-0.21412	0.25500
MTOT72	0.99891	0.28388	0.81455	0.04280	0.12360	-0.16843	-0.01716	0.09511	-0.12300	0.08367	-0.22024	0.26641

	E2UPA	E2CGO	E2TUC	E2CIP	E2USE	T2AGE	T2TS3	PCT71	PCT72	MTOT71	MTOT72
RESM72	0.12520	0.02052	-0.21401	-0.13936	0.11547	0.00580	-0.08767	0.06229	0.00035	0.81890	0.99891
COMPSES	-0.05135	0.18694	-0.35681	-0.40226	0.05867	-0.03349	0.05958	0.07905	-0.01076	0.29635	0.28988
RESM71	0.11894	0.07652	-0.17507	-0.21868	0.03021	-0.06114	-0.03267	-0.00000	-0.02839	0.99602	0.81455
SUM04	0.88542	0.09558	0.30936	0.44206	-0.07456	-0.00617	0.19576	-0.36829	-0.17795	0.02102	0.04280
SUM10	0.76263	0.03331	0.31188	0.49603	0.39118	-0.21672	0.26649	-0.46834	-0.42484	0.08326	0.12360
E2NMIN	0.03283	-0.41180	0.21954	0.32173	-0.15919	-0.17440	0.08000	-0.09366	0.43645	-0.14571	-0.16843
T2TQ	-0.25044	0.16072	-0.44837	-0.29161	-0.28736	0.65584	-0.37012	0.62251	0.37188	-0.03649	-0.01716
E2UO	0.09477	-0.32103	-0.22002	0.59639	0.78392	-0.16910	0.06545	0.16874	-0.12098	0.00548	0.09511
E2IDM	0.41463	0.62745	0.50899	-0.06987	-0.78524	0.08232	0.36532	-0.51881	-0.21839	-0.05582	-0.12300
E2TLDM	0.10274	-0.66805	0.22824	0.33886	0.66769	-0.23596	-0.22600	-0.06966	-0.02687	0.04076	0.08367
E2IIP	-0.38987	-0.06854	0.14720	0.15494	-0.48436	0.40523	-0.26640	0.42167	0.44125	-0.21412	-0.22024
E2SC	0.04998	-0.08701	-0.85166	-0.58005	0.27894	0.02658	-0.20475	0.48118	0.36332	0.25500	0.26641
E2UPA	1.00000	0.18613	0.11392	0.14385	-0.08699	-0.07196	0.23575	-0.44979	-0.25638	0.12980	0.13702
E2CGO	0.18613	1.00000	-0.02759	-0.42206	-0.50078	0.15384	0.36161	-0.29573	-0.48990	0.08482	0.04333
E2TUC	0.11392	-0.02759	1.00000	0.49360	-0.11047	-0.23942	0.32413	-0.74606	-0.40656	-0.16050	-0.19482
E2CIP	0.14385	-0.42206	0.49360	1.00000	0.44293	-0.13341	0.04530	-0.21330	-0.21170	-0.19957	-0.12934
E2USE	-0.08699	-0.50078	-0.11047	0.44293	1.00000	-0.32879	-0.04556	0.06674	-0.14928	0.04633	0.12231
T2AGE	-0.07196	0.15384	-0.23942	-0.13341	-0.32879	1.00000	-0.41794	0.39770	0.17971	-0.05807	-0.00258
T2TS3	0.23575	0.36161	0.32413	0.04530	-0.04556	-0.41794	1.00000	-0.54285	-0.41240	-0.03405	-0.06035
PCT71	-0.44979	-0.29573	-0.74606	-0.21330	0.06674	0.39770	-0.54285	1.00000	0.72636	-0.01385	0.02836
PCT72	-0.25638	-0.48990	-0.40656	-0.21170	-0.14928	0.17971	-0.41240	0.72636	1.00000	-0.03528	-0.04627
MTOT71	0.12980	0.08482	-0.16050	-0.19957	0.04633	-0.05807	-0.03405	-0.01385	-0.03528	1.00000	0.81972
MTOT72	0.13702	0.04333	-0.19482	-0.12934	0.12231	-0.00258	-0.06035	0.02836	-0.04627	0.81972	1.00000

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TABLE V-N-6

Intercorrelations among the Key Analysis Variables -- Cohort 6, Spring, 1973 Arith. Total Score Analysis

[r (p<.05) = .632 , k_{eff} = 10]

	RESM73	COMPSES	RESM72	SUM04	SUM10	E3MMIN	T3TQ	E3UO	E3IDM	E3TLDM	E3IIP	E3SC
RESM73	1.00000	0.29069	0.85485	-0.22502	-0.22243	-0.16083	0.12133	-0.12890	-0.13275	-0.19093	-0.32367	0.20058
COMPSES	0.29069	1.00000	0.27369	0.11934	0.12325	-0.29802	-0.03496	0.11281	0.08482	-0.19270	-0.12797	0.48899
RESM72	0.85485	0.27369	1.00000	-0.19234	-0.19637	-0.11429	0.12143	-0.08900	-0.14257	-0.15853	-0.33190	0.20838
SUM04	-0.22502	0.11934	-0.19234	1.00000	0.97680	0.04123	-0.43577	0.73993	0.62089	0.36633	0.75876	0.29794
SUM10	-0.22243	0.12325	-0.19637	0.97680	1.00000	0.02205	-0.40687	0.74210	0.56001	0.45863	0.74087	0.37401
E3MMIN	-0.16088	-0.29802	-0.11429	0.04128	0.02205	1.00000	-0.07458	0.08697	0.01004	0.15148	0.20272	-0.47204
T3TQ	0.12133	-0.03496	0.12143	-0.43577	-0.40637	-0.07458	1.00000	-0.12273	-0.32289	-0.24148	-0.26846	0.08936
E3UO	-0.12890	0.11281	-0.08900	0.73993	0.74210	0.08697	-0.12273	1.00000	0.24174	0.25825	0.67268	0.31986
E3IDM	-0.13275	0.08482	-0.14257	0.62089	0.56001	0.01004	-0.32283	0.24174	1.00000	-0.19292	0.48752	0.13944
E3TLDM	-0.19033	-0.19270	-0.15853	0.36633	0.45863	0.15143	-0.24148	0.25825	-0.19292	1.00000	0.31386	-0.13586
E3IIP	-0.32367	-0.12797	-0.33190	0.75876	0.74087	0.20272	-0.26846	0.67268	0.48752	0.31386	1.00000	-0.08371
E3SC	0.20058	0.48899	0.20838	0.26794	0.37401	-0.47204	0.08936	0.31986	0.13944	-0.13586	-0.08371	1.00000
E3UPA	-0.11078	0.21761	-0.06669	0.72661	0.70558	-0.09513	-0.48791	0.29302	0.46874	0.29717	0.24370	0.31116
E3CGO	-0.07298	0.05564	-0.02357	0.45352	0.37670	-0.17663	-0.27718	-0.03652	0.59118	0.08241	0.20651	0.05023
E3TUC	-0.20089	-0.01754	-0.26630	0.32434	0.39306	0.23773	-0.20159	0.27386	0.31116	-0.04116	0.46094	0.07860
E3CIP	-0.32332	-0.14230	-0.31151	0.77351	0.83302	0.21833	-0.40578	0.62178	0.32117	0.71850	0.74565	-0.06654
E3USE	-0.07540	0.13065	-0.03502	0.70172	0.70723	0.02326	-0.13138	0.79605	0.18190	0.32909	0.49637	0.41244
T3AGE	0.05645	0.02035	0.06729	-0.11652	-0.14043	-0.02259	0.67060	0.03470	-0.09955	-0.18055	0.03143	0.04960
T3TSB	-0.08705	0.05705	-0.06815	0.18782	0.10751	-0.02988	-0.35899	0.10433	0.13196	-0.02171	0.11564	-0.13016
PCT72	-0.02599	-0.02954	0.00000	-0.02517	0.09647	0.52681	0.06194	0.27796	-0.37732	0.34173	-0.00478	0.08101
PCT73	0.00000	0.23923	-0.02530	0.18920	0.24487	0.27911	-0.10861	0.34397	0.03748	-0.15839	0.09621	0.36416
MTOT72	0.85517	0.27416	0.99985	-0.19188	-0.19800	-0.12330	0.12035	-0.09375	-0.13608	-0.16436	-0.33177	0.20696
MTOT73	0.99816	0.30467	0.85171	-0.21313	-0.20717	-0.14365	0.11452	-0.10730	-0.13023	-0.20018	-0.31724	0.22229

	E3UPA	E3CGO	E3TUC	E3CIP	E3USE	T3AGE	T3TSB	PCT72	PCT73	MTOT72	MTOT73
RESM73	-0.11078	-0.07298	-0.20089	-0.32332	-0.07540	0.05645	-0.08705	-0.02599	0.00000	0.85517	0.99816
COMPSES	0.21761	0.05564	-0.01754	-0.14230	0.13065	0.02035	0.05705	-0.02954	0.23923	0.27416	0.30467
RESM72	-0.06669	-0.02357	-0.26630	-0.31151	-0.03502	0.06729	-0.06815	0.00000	-0.02530	0.99985	0.85171
SUM04	0.72661	0.45852	0.32434	0.77351	0.70172	-0.11652	0.18782	-0.02517	0.18920	-0.19188	-0.21313
SUM10	0.70558	0.37670	0.33306	0.83302	0.70723	-0.14043	0.10751	0.09647	0.24487	-0.19800	-0.20717
E3MMIN	-0.09513	-0.17668	0.23773	0.21833	0.02326	-0.02259	-0.02988	0.52681	0.27911	-0.12330	-0.14365
T3TQ	-0.48791	-0.27718	-0.20159	-0.40578	-0.13138	0.67060	-0.35899	0.06194	-0.10861	0.12035	0.11452
E3UO	0.29302	-0.03652	0.27386	0.62178	0.79605	0.03470	0.10433	0.27796	0.34397	-0.09375	-0.10780
E3IDM	0.46874	0.59118	0.31116	0.32117	0.18190	-0.09955	0.13196	-0.37732	0.03748	-0.13608	-0.13023
E3TLDM	0.29717	0.08241	-0.04116	0.71850	0.32909	-0.18055	-0.02171	0.34173	-0.15839	-0.16436	-0.20018
E3IIP	0.24370	0.20651	0.46094	0.74565	0.49637	0.03143	0.11564	-0.00478	0.09621	-0.33177	-0.31724
E3SC	0.31116	0.05023	0.07860	-0.06654	0.41244	0.04960	-0.13016	0.08101	0.36416	0.20696	0.22229
E3UPA	1.00000	0.61850	0.05217	0.48485	0.20891	-0.24184	0.30813	-0.03713	0.17573	-0.06604	-0.09974
E3CGO	0.61850	1.00000	-0.40235	0.14530	-0.00801	-0.00583	0.34475	-0.53388	-0.47874	-0.01441	-0.10188
E3TUC	0.05217	-0.40235	1.00000	0.43542	0.20910	-0.17616	-0.22418	0.37635	0.68758	-0.27272	-0.15382
E3CIP	0.48485	0.14530	0.43542	1.00000	0.55450	-0.21498	0.04671	0.22648	0.11045	-0.31534	-0.31603
E3USE	0.20891	-0.00801	0.20910	0.55450	1.00000	0.00860	-0.06525	0.11868	0.15533	-0.03704	-0.06584
T3AGE	-0.24184	-0.00583	-0.17616	-0.21498	0.00860	1.00000	-0.05544	-0.02765	-0.12045	0.06775	0.04904
T3TSB	0.30813	0.34475	-0.22418	0.04671	-0.06525	-0.05544	1.00000	-0.20564	-0.08590	-0.06461	-0.09198
PCT72	-0.03713	-0.53388	0.37635	0.22648	0.11868	-0.02765	-0.20564	1.00000	0.66493	-0.01714	0.01433
PCT73	0.17573	-0.47874	0.68758	0.11045	0.15533	-0.12045	-0.08590	0.66493	1.00000	-0.03716	0.05064
MTOT72	-0.06604	-0.01441	-0.27272	-0.31534	-0.03704	0.06775	-0.06461	-0.01714	-0.03716	1.00000	0.85134
MTOT73	-0.09974	-0.10188	-0.15382	-0.31603	-0.06584	0.04904	-0.09198	0.01433	0.05064	0.85134	1.00000

APPENDIX V-O

Commonality Analysis Tables
for the Degree of Individualization Growth Model--
Arithmetic Total Score Analyses

TABLE V-O-1

Commonality Coefficients* for the Degree of Individualization Growth Model -- Cohort 1, Spring 1972, Arithmetic Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_1)$	.08283 (.34058)	.10585 (.43527)	.00597 (.02455)	.00016 (.00067)
C(S,P)	.04384 (.18029)	.04384 (.18029)		
C(S,E)	-.00477 (-.01962)		-.00477 (-.01962)	
C(S,T)	.00060 (.00245)			.00060 (.00245)
C(P,E)		.01189 (.04888)	.01189 (.04888)	
C(P,T)		.00063 (.00257)		.00063 (.00257)
C(E,T)			.00033 (.00136)	.00033 (.00136)
C(S,P,E)	-.00251 (-.01034)	-.00251 (-.01034)	-.00251 (-.01034)	
C(S,P,T)	-.00101 (-.00416)	-.00101 (-.00416)		-.00101 (-.00416)
C(S,E,T)	-.00056 (-.00230)		-.00056 (-.00230)	-.00056 (-.00230)
C(P,E,T)		.00074 (.00303)	.00074 (.00303)	.00074 (.00303)
C(S,P,E,T)	-.00078 (-.00322)	-.00078 (-.00322)	-.00078 (-.00322)	-.00078 (-.00322)
$R^2(X_1)$	.11763	.15864	.01029	.00010

$R^2(S,P,E,T) = .24319$

$R^2(S,P,D,T)^+ = .32758$

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* Below each commonality coefficient and in parentheses is the normalized coefficient; that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-0-2

Commonality Coefficients* for the Degree of Individualization Growth Model --
Cohort 1, Spring 1973, Arithmetic Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.00000	.45762	.02064	.00405
	(.00000)	(.82942)	(.03742)	(.00733)
C(S,P)	.04238	.04238		
	(.07681)	(.07681)		
C(S,E)	.00017		.00017	
	(.00031)		(.00031)	
C(S,T)	.00007			.00007
	(.00013)			(.00013)
C(P,E)		-.00214	-.00214	
		(-.00389)	(-.00389)	
C(P,T)		.01100		.01100
		(.01994)		(.01994)
C(E,T)			.00342	.00342
			(.00619)	(.00619)
C(S,P,E)	-.00044	-.00044	-.00044	
	(-.00079)	(-.00079)	(-.00079)	
C(S,P,T)	.01112	.01112		.01112
	(.02016)	(.02016)		(.02016)
C(S,E,T)	-.00024		-.00024	-.00024
	(-.00044)		(-.00044)	(-.00044)
C(P,E,T)		.00248	.00248	.00248
		(.00449)	(.00449)	(.00449)
C(S,P,E,T)	.00161	.00161	.00161	.00161
	(.00292)	(.00292)	(.00292)	(.00292)
$R^2(X_i)$	.05467	.52362	.02550	.03351

$R^2(S,P,E,T) =$ .55173

$R^2(S,P,D,T)^+ =$ .63544

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* Below each commonality coefficient and in parentheses is the normalized coefficient; that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+ The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-0-3

Commonality Coefficients* for the Degree of Individualization Growth Model-- Cohort 4, Spring 1972, Arithmetic Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.00416 (.00654)	.53941 (.84878)	.00077 (.00120)	.00068 (.00107)
C(S,P)	.08219 (.12933)	.08219 (.12933)		
C(S,E)	.00006 (.00010)		.00006 (.00010)	
C(S,T)	.00076 (.00120)			.00076 (.00120)
C(P,E)		.00499 (.00785)	.00499 (.00785)	
C(P,T)		-.00067 (-.00105)		-.00067 (-.00105)
C(E,T)			-.00018 (-.00028)	-.00018 (-.00028)
C(S,P,E)	.00236 (.00371)	.00236 (.00371)	.00236 (.00371)	
C(S,P,T)	.00157 (.00248)	.00157 (.00248)		.00157 (.00248)
C(S,E,T)	-.00008 (-.00013)		-.00008 (-.00013)	-.00008 (-.00013)
C(P,E,T)		.00031 (.00049)	.00031 (.00049)	.00031 (.00049)
C(S,P,E,T)	-.00082 (-.00129)	-.00082 (-.00129)	-.00082 (-.00129)	-.00082 (-.00129)
$R^2(X_i)$	.09021	.62935	.00741	.00158

$R^2(S,P,E,T) = .63552$

$R^2(S,P,D,T)^{+} = .68854$

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*Below each commonality coefficient and in parentheses is the normalized coefficient; that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-O-4

Commonality Coefficients* for the Degree of Individualization Growth Model--Cohort 4, Spring 1973, Arithmetic Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.00446 (.00663)	.54822 (.81585)	.00066 (.00098)	.00018 (.00027)
C(S,P)	.08621 (.12829)	.08621 (.12829)		
C(S,E)	.00017 (.00026)		.00017 (.00026)	
C(S,T)	.00011 (.00017)			.00011 (.00017)
C(P,E)		.02205 (.03281)	.02205 (.03281)	
C(P,T)		.00094 (.00140)		.00094 (.00140)
C(E,T)			-.00010 (-.00015)	-.00010 (-.00015)
C(S,P,E)	.00719 (.01069)	.00719 (.01069)	.00719 (.01069)	
C(S,P,T)	-.00075 (-.00111)	-.00075 (-.00111)		-.00075 (-.00111)
C(S,E,T)	-.00001 (-.00002)		-.00001 (-.00002)	-.00001 (-.00002)
C(P,E,T)		.00340 (.00506)	.00340 (.00506)	.00340 (.00506)
C(S,P,E,T)	-.00077 (-.00115)	-.00077 (-.00115)	-.00077 (-.00115)	-.00077 (-.00115)
$R^2(X_i)$	.09660	.66649	.03259	.00301

$R^2(S,P,E,T) = .67196$

$R^2(S,P,D,T)^+ = .71124$

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* Below each commonality coefficient and in parentheses is the normalized coefficient; that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

** DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-0-5

Commonality Coefficients* for the Degree of Individualization Growth Model--Cohort 6, Spring 1972, Arithmetic Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.00352 (.00526)	.56383 (.84183)	.00378 (.00565)	.00077 (.00115)
C(S,P)	.07708 (.11508)	.07708 (.11508)		
C(S,E)	-.00098 (-.00146)		-.00098 (-.00146)	
C(S,T)	-.00015 (-.00022)			-.00015 (-.00022)
C(P,E)		.01822 (.02720)	.01822 (.02720)	
C(P,T)		-.00062 (-.00093)		-.00062 (-.00093)
C(E,T)			-.00016 (-.00023)	-.00016 (-.00023)
C(S,P,E)	.00431 (.00643)	.00431 (.00643)	.00431 (.00643)	
C(S,P,T)	.00094 (.00141)	.00094 (.00141)		.00094 (.00141)
C(S,E,T)	.00021 (.00031)		.00021 (.00031)	.00021 (.00031)
C(P,E,T)		.00002 (.00003)	.00002 (.00003)	.00002 (.00003)
C(S,P,E,T)	-.00102 (-.00152)	-.00102 (-.00152)	-.00102 (-.00152)	-.00102 (-.00152)
$R^2(X_i)$	.08392	.66276	.02439	.00000

$R^2(S,P,E,T) = .66977$

$R^2(S,P,D,T)^+ = .68975$

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*Below each commonality coefficient and in parentheses is the normalized coefficient; that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

**DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

TABLE V-O-6

Commonality Coefficients* for the Degree of Individualization Growth Model--Cohort 6, Spring 1973, Arithmetic Total Score Analysis

Commonality Coefficient	SES(S)	Pretest (P)	EdExAG Variables DI and NMIN(E)**	Teaching Qualifications(T)
$U(X_i)$	.00310 (.00418)	.58533 (.78912)	.00702 (.00946)	.00015 (.00021)
C(S,P)	.07940 (.10704)	.07940 (.10704)		
C(S,E)	.00054 (.00073)		.00054 (.00073)	
C(S,T)	.00002 (.00002)			.00002 (.00002)
C(P,E)		.04758 (.06415)	.04758 (.06415)	
C(P,T)		.00011 (.00015)		.00011 (.00015)
C(E,T)			.00033 (.00044)	.00033 (.00044)
C(S,P,E)	.00405 (.00546)	.00405 (.00546)	.00405 (.00546)	
C(S,P,T)	-.00002 (-.00002)	-.00002 (-.00002)		-.00002 (-.00002)
C(S,E,T)	-.00018 (-.00025)		-.00018 (-.00025)	-.00018 (-.00025)
C(P,E,T)		.01672 (.02254)	.01672 (.02254)	.01672 (.02254)
C(S,P,E,T)	-.00240 (-.00324)	-.00240 (-.00324)	-.00240 (-.00324)	-.00240 (-.00324)
$R^2(X_i)$	.08450	.73077	.07365	.01472

$R^2(S,P,E,T) = .74174$

$R^2(S,P,D,T)^+ = .75048$

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[*] Below each commonality coefficient and in parentheses is the normalized coefficient; that is, the commonality coefficient divided by $R^2(S,P,E,T)$.

[**] DI and NMIN are abbreviations for Degree of Individualization and Number of Minutes per Day.

+The multiple correlation squared of posttest with SES, pretest, the dummy variables encoding EdExAG group membership and the three key teacher variables.

APPENDIX V-P

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups from Cohorts 4 and 6 - Arithmetic Total Score Analyses

TABLE V-P-1
Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups--Cohort 4, Spring 1972, Arithmetic Total Score Analysis

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Students		48	18	24	10	22	117
Posttest Residualized for Pretest and SES	$\bar{X}$	-20.09	-26.50	-27.91	26.34	25.43	22.24
	SD	30.10	29.92	46.93	13.87	28.01	40.27
	g[1]	-0.27	0.12	-3.15	0.55	0.15	0.07
Pretest (National Norm=400)	$\bar{X}$	413.00	399.50	414.91	421.82	391.77	400.91
	SD	34.21	27.95	30.67	26.54	38.97	39.44
	g	-0.81	0.39	-0.44	0.37	0.17	-0.36
Posttest (National Norm=440)	$\bar{X}$	434.98	413.41	426.64	491.01	454.79	466.84
	SD	49.16	49.23	44.93	33.33	61.01	64.22
	g	-0.00	0.74	-1.14	0.43	0.34	0.12
Attitude toward Math SP71	$\bar{X}$	100.07	102.03	104.92	105.33	97.44	100.12
	SD	8.98	9.23	9.31	8.31	10.98	9.89
	g	-0.34	-0.64	-1.74	-1.91	-0.08	-0.48
Attitude toward Math SP72	$\bar{X}$	97.69	*	104.46	101.29	100.86	99.73
	SD	8.46		8.32	8.14	11.04	10.22
	g	-0.23		-1.43	-0.84	-0.55	-0.35
SES	$\bar{X}$	96.40	97.44	89.87	94.94	93.60	104.81
	SD	5.17	6.16	5.98	6.83	6.78	8.36
	g	0.69	1.05	0.19	0.88	1.30	-0.33
Ethnic Group[2] (white=1; non-white=0)	$\bar{X}$	0.98	0.60	0.92	1.00	0.95	0.89

(continued)

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[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is an EdExAG-group mean for variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

*Note: Blank entires indicate no data collected.

TABLE V-P-1 (continued)

Variable	Greatest Negative Outliers			Greatest Positive Outliers		
Sex^2 $\bar{X}$ (girl=1;boy=0)	0.44	0.53	0.42	0.70	0.36	0.57
Utilization of Objectives	3.00	3.00	1.00	1.00	1.67	3.00
Individualization in Decision Making	1.67	1.00	1.00	1.00	1.00	1.67
Teacher or Locally Developed Materials	1.50	1.50	1.00	1.50	2.00	2.00
Individualization of Instructional Pace	2.00	3.00	1.00	1.00	1.00	2.00
Scheduling Characteristics	2.00	3.00	1.00	1.00	1.00	2.00
Use of Performance Agreements	1.00	3.00	1.00	1.00	1.00	2.00
Classroom Group Organization	2.00	3.00	1.00	1.00	1.00	2.00
Teaching Unit Composition	2.00	2.50	2.00	2.00	1.00	3.00
Completeness of Instructional Package	2.00	2.50	1.50	1.50	2.50	2.50
Utilization of Student Evaluation	3.00	3.00	1.67	2.33	2.67	3.00
Level of Innovation	20.17	25.50	12.17	13.33	14.83	23.17
Degree of Individualization	7.67	10.00	4.67	5.33	5.67	8.67
Number of School Days per Year	180.00	180.00	180.00	180.00	180.00	200.00
Number of Minutes per Day	45.00	50.00	45.00	45.00	60.00	42.00

(continued)

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[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-P-1 (continued)

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Teachers	$\bar{X}$	1.00	1.00	1.00	1.00	1.00	4.00
Teacher's Age	$\bar{X}$	40.00	24.00	50.00	50.00	34.18	40.00
Teacher's Socioeconomic Background	$\bar{X}$	96.00	98.65	91.11	91.11	97.37	100.83
Teaching Qualifications	$\bar{X}$	112.76	88.83	108.14	109.66	97.49	103.74

TABLE V-P-2

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups-- Cohort 4, Spring 1973, Arithmetic Total Score Analysis

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
		24	28	53	21	20	58
Number of Students		24	28	53	21	20	58
Posttest Residualized for Pretest and SES	$\bar{X}$	-14.67	-16.96	-17.73	32.37	26.98	25.01
	SD	32.31	31.48	37.94	30.00	29.52	30.82
	g[1]	-0.30	-0.28	-0.36	0.07	-0.10	-0.00
Pretest (National Norm=440)	$\bar{X}$	447.57	445.86	542.65	424.46	423.22	465.80
	SD	48.08	48.83	35.52	52.01	57.38	38.87
	g	0.73	-0.72	0.36	-0.15	1.54	-0.29
Posttest (National Norm=476)	$\bar{X}$	467.26	464.32	548.57	487.87	485.32	524.88
	SD	46.47	54.72	32.86	68.27	49.21	45.25
	g	0.23	-0.20	0.16	-0.17	0.97	-0.68
Attitude toward Math, SP72	$\bar{X}$	99.02	98.04	101.46	95.84	*	94.43
	SD	9.56	8.84	9.60	10.92		9.68
	g	-0.13	0.06	-0.61	0.23		0.46
Attitude toward Math, SP73	$\bar{X}$	105.18	94.26	107.24	98.47		93.57
	SD	10.31	8.00	7.63	11.00		8.17
	g	-0.86	0.51	-0.72	0.31		0.39
SES	$\bar{X}$	105.67	108.67	108.71	91.60	100.42	110.19
	SD	8.48	8.66	7.14	5.42	9.17	6.00
	g	-0.58	-0.83	-0.75	-0.36	0.70	-0.85
Ethnic Group[2] (white=1; non-white=0)	$\bar{X}$	0.96	0.89	0.96	0.86	0.65	0.98

(continued)

[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is an EdExAG-group mean for variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

*Note: Blank entries indicate no data collected.

TABLE V-2-P (continued)

Variable	Greatest Negative Outliers			Greatest Positive Outliers		
Sex[2] (girl=1;boy=0)	0.50	0.39	0.47	0.43	0.72	0.50
Utilization of Objectives	3.00	3.00	3.00	1.67	3.00	1.67
Individualization in Decision Making	1.33	1.00	1.00	1.67	1.00	1.00
Teacher or Locally Developed Materials	2.00	2.00	1.50	2.00	1.50	2.50
Individualization of Instructional Pace	3.00	3.00	1.00	2.00	3.00	2.00
Scheduling Characteristics	2.00	2.00	1.00	2.00	2.00	1.00
Use of Performance Agreements	3.00	3.00	1.00	2.00	1.00	2.00
Classroom Group Organization	2.00	2.00	1.00	2.00	3.00	1.00
Teaching Unit Composition	2.50	2.50	1.00	2.50	1.50	1.00
Completeness of Instructional Package	2.00	2.50	1.00	2.00	2.50	2.00
Utilization of Student Evaluation	2.33	3.00	3.00	1.67	2.00	2.67
Level of Innovation	23.17	24.00	14.50	19.50	20.50	16.83
Degree of Individualization	9.66	10.00	6.00	7.34	7.00	7.67
Number of School Days per Year	200.00	200.00	200.00	182.00	180.00	182.00
Number of Minutes per Day	50.00	50.00	50.00	60.00	55.00	60.00

(continued)

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-P-2 (continued)

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Teacher/Student Contact Ratio[3]	$\bar{X}$	3.33	2.50	3.70	3.38	3.59	3.33
Number of Teachers	$\bar{X}$	1.00	1.00	1.00	2.00	1.00	1.00
Teacher's Age	$\bar{X}$	24.00	40.00	30.00	40.00	30.00	40.00
Teacher's Socio-economic Background	$\bar{X}$	104.41	95.56	108.04	94.69	87.22	95.96
Teaching Qualifications		86.82	102.37	103.61	86.63	105.45	100.12

[3] Relative measure of teacher/student contact equal to the percent of teacher time per individual student.

TABLE V-P-3

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups-- Cohort 6, Spring 1972, Arithmetic Total Score Analysis

Variable		Greatest Negative Outliers		Greatest Positive Outliers		
Number of Students		49	55	220	80	154
Posttest Residualized for Pretest and SES	$\bar{X}$	-18.27	-25.24	10.00	6.95	6.25
	SD	48.21	50.82	41.73	45.22	41.78
	g^1	-0.71	-0.55	-0.03	0.52	-0.49
Pretest (National Norm=476)	$\bar{X}$	488.14	491.79	506.61	463.67	520.35
	SD	61.52	59.95	47.96	46.65	50.68
	g	0.03	0.03	-0.36	0.00	-0.24
Posttest (Interpolated National Norm=509.5)	$\bar{X}$	493.21	489.46	540.72	491.24	553.59
	SD	62.59	80.09	64.63	73.99	65.92
	g	0.30	0.13	0.03	0.51	-0.47
Attitude toward Math, SP71	$\bar{X}$	100.89	98.80	103.21	104.42	102.90
	SD	9.29	9.59	8.81	9.52	9.59
	g	-0.03	0.25	-0.43	-0.52	-0.42
Attitude toward Math, SP72	$\bar{X}$	*		101.36	102.24	98.63
	SD			9.19	11.37	9.63
	g			-0.24	-0.25	0.15
SES	$\bar{X}$	100.33	99.16	101.94	93.94	108.93
	SD	9.35	8.82	12.12	7.79	6.83
	g	0.21	0.58	-0.70	0.28	-1.20
Ethnic Group^2 (white=1;nonwhite=0)	$\bar{X}$	0.82	0.77	0.76	0.38	0.98

(continued)

[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is an EdExAG-group mean for variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

*Note: Blank entries indicate no data collected.

TABLE V-P-3 (continued)

Variable		Greatest Negative Outliers		Greatest Positive Outliers		
Sex[2] (girl=1;boy=0)	$\bar{X}$	0.47	0.56	0.51	0.55	0.49
Utilization of Objectives		3.00	1.00	3.00	3.00	3.00
Individualization in Decision Making		2.00	2.00	1.00	1.67	1.00
Teacher or Locally Developed Materials		1.50	2.00	3.00	1.00	2.50
Individualization of Instructional Pace		3.00	3.00	2.00	3.00	2.00
Scheduling Characteristics		1.00	1.00	3.00	1.00	3.00
Use of Performance Agreements		3.00	2.00	3.00	3.00	2.00
Classroom Group Organization		3.00	3.00	1.00	3.00	3.00
Teaching Unit Composition		3.00	3.00	1.50	1.50	1.00
Completeness of Instructional Package		2.50	1.50	2.50	3.00	2.00
Utilization of Student Evaluation		2.00	1.00	3.00	2.00	3.00
Level of Innovation		24.00	19.50	23.00	22.17	22.50
Degree of Individualization		10.00	8.00	9.00	9.67	8.00
Number of School Days per Year		180.00	180.00	180.00	180.00	180.00
Number of Minutes per Day		60.00	50.00	60.00	60.00	30.00

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-P-3 (continued)

Variable		Greatest Negative Outliers		Greatest Positive Outliers		
Number of Teachers		1.00	1.00	2.30	1.00	3.00
Teacher's Age		30.00	50.00	37.03	55.00	43.33
Teacher's Socio-economic Background	$\bar{X}$	110.91	91.11	92.32	93.14	94.43
Teaching Qualifications	$\bar{X}$	99.43	106.68	100.18	110.71	108.43

TABLE V-P-4

Comparison of Key Analysis Variables for Positive and Negative Outlier EdExAG Groups-- Cohort 6, Spring 1973, Arithmetic Total Score Analysis

Variable		Greatest Negative Outliers			Greatest Positive Outliers		
Number of Students		224	32	36	37	140	29
Posttest Residualized for Pretest and SES	$\bar{X}$	-12.37	-13.25	-14.82	16.13	11.78	11.22
	SD	33.80	37.12	34.74	42.42	43.16	32.18
	g^1	-1.47	-0.73	-0.82	-1.65	-2.19	-0.03
Pretest (Interpolated National Norm=509.5)	$\bar{X}$	543.95	475.53	450.23	496.58	550.41	553.18
	SD	61.24	45.12	26.07	66.74	66.51	54.25
	g	0.18	0.61	-0.13	0.48	-0.34	0.31
Posttest (National Norm=545)	$\bar{X}$	551.47	487.46	458.47	537.62	578.72	586.74
	SD	66.28	63.71	37.63	75.88	70.92	61.70
	g	-0.21	0.25	-0.10	-0.26	-0.93	-0.48
Attitude toward Math, SP72	$\bar{X}$	101.63	97.85	98.73	98.62	101.57	98.84
	SD	9.14	11.06	10.76	10.36	8.75	10.68
	g	-0.18	0.31	0.23	0.19	-0.27	0.20
Attitude toward Math, SP73	$\bar{X}$	101.63	101.94	100.40	100.36	101.36	100.76
	SD	9.17	9.88	9.12	9.25	9.92	11.23
	g	-0.22	-0.09	0.02	0.12	-0.27	-0.12
SES	$\bar{X}$	102.21	103.11	94.73	105.74	96.04	108.84
	SD	11.63	7.90	8.83	8.62	6.55	5.98
	g	-0.75	0.09	0.16	-0.52	0.79	-0.84
Ethnic Group[2] (white=1; non-white=0)	$\bar{X}$	0.80	0.75	0.39	0.73	0.96	1.00

(continued)

[1] Index of skewness

$$g = \frac{\frac{\Sigma x^3}{N}}{\frac{\Sigma x^2}{N}\sqrt{\frac{\Sigma x^2}{N}}}$$

, where g = skewness index,

x = deviation of a score from $\bar{X}$, where $\bar{X}$ is an EdExAG-group mean for variable X, and

N = number of students.

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-P-4 (continued)

Variable	Greatest Negative Outliers			Greatest Positive Outliers		
Sex^2 (girl=1;boy=0) $\bar{X}$	0.50	0.47	0.53	0.46	0.56	0.66
Utilization of Objectives	3.00	3.00	3.00	3.00	1.67	3.00
Individualization in Decision Making	1.00	1.00	1.67	1.57	1.00	1.00
Teacher or Locally Developed Materials	3.00	2.00	2.00	2.00	2.00	1.50
Individualization of Instructional Pace	2.00	2.00	3.00	3.00	1.00	1.00
Scheduling Characteristics	2.00	2.00	1.00	2.00	1.00	1.00
Use of Performance Agreements	3.00	3.00	3.00	3.00	1.00	1.00
Classroom Group Organization	2.00	1.00	3.00	2.00	2.00	1.00
Teaching Unit Composition	1.50	2.50	2.50	3.00	1.00	1.00
Completeness of Instructional Package	2.50	2.50	3.00	2.50	1.00	1.00
Utilization of Student Evaluation	3.00	3.00	2.00	2.33	1.33	3.00
Level of Innovation	23.00	22.00	24.17	24.50	13.00	14.50
Degree of Individualization	9.00	9.00	9.67	10.00	4.33	6.00
Number of School Days per Year	180.00	200.00	178.00	200.00	182.00	200.00
Number of Minutes per Day	60.00	50.00	60.00	30.00	50.00	50.00

(continued)

[2] For binary coded variables the $\bar{X}$ is equal to the proportion of students coded with a "1."

TABLE V-P-4 (continued)

Variable		Greatest Negative Outliers			Greatest Positive Outliers	
Teacher/Student Contact Ratio[3]	3.03	3.33	4.55	5.71	3.35	3.70
Number of Teachers $\bar{X}$	1.41	1.00	1.00	4.00	1.01	1.03
Teacher's Age $\bar{X}$	37.02	30.00	39.17	36.00	39.54	30.34
Teacher's Socio-economic Background $\bar{X}$	95.29	103.04	102.15	92.77	91.30	107.67
Teaching Qualifications $\bar{X}$	101.74	93.47	104.96	97.40	109.35	103.63

[3] Relative measure of teacher/student contact equal to the percent of teacher time per individual student.